

Marine Review

SHIP OPERATION

SHIPBUILDING

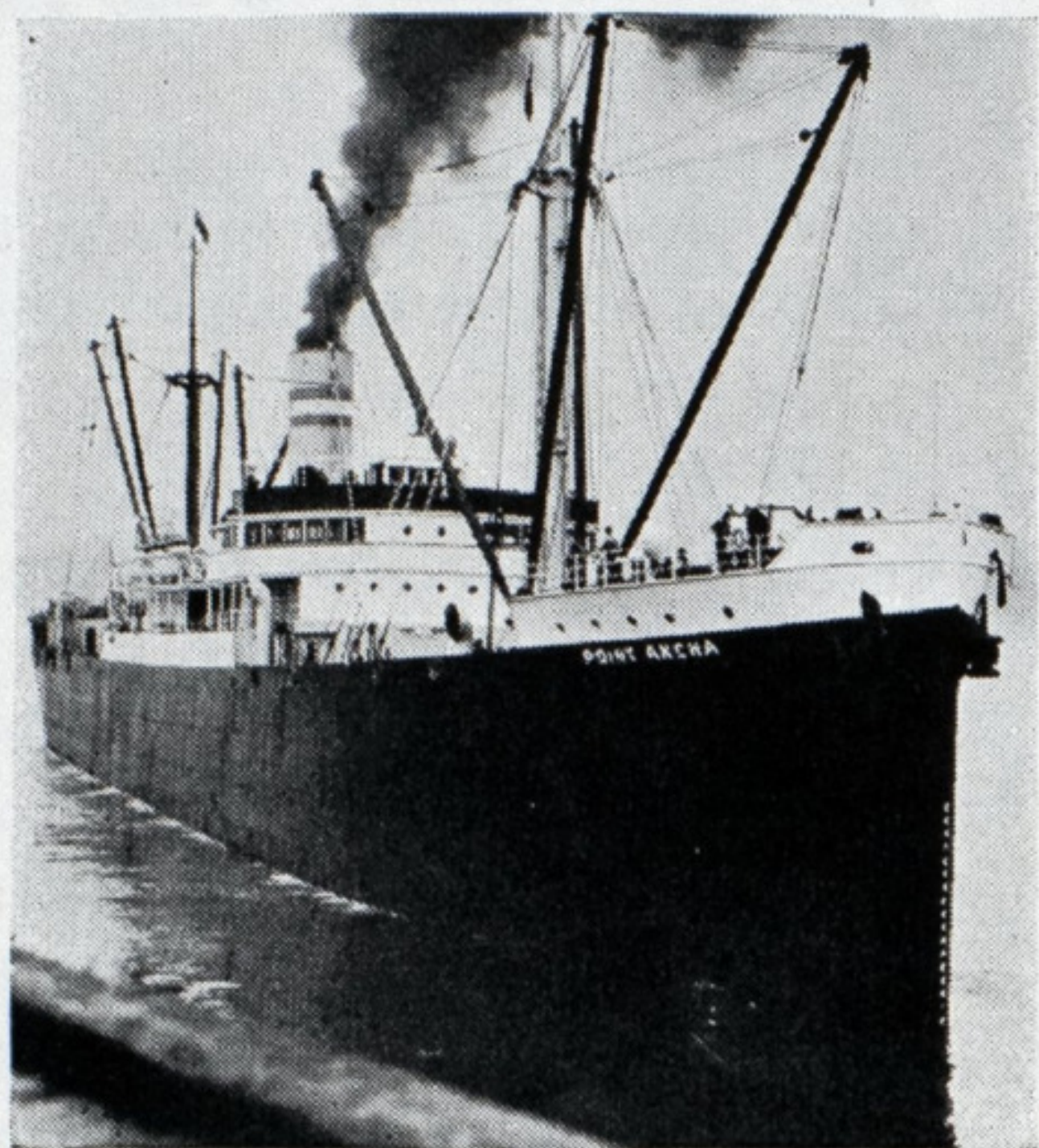
CARGO HANDLING

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Vigorous Action is Needed for Merchant Marine

THE country is fortunate in having a President who is sea-minded. He fully realizes that without adequate sea power both in the navy and in the merchant marine this country cannot remain a first class power or fulfill its destiny. He has sponsored and brought to effective realization a naval building policy which will assure a navy of treaty strength if the terms of the Vinson act are carried out. That this will be done seems evident from a recent announcement by the secretary of the navy that bids will be taken promptly on the first part of this program, funds for which are now available.

There is, however, a great necessity that similar effective action be taken with reference to building up a sufficiently large and efficient merchant marine. Without such a merchant marine, our sea power will suffer in comparison with that of other nations. Though the President has repeatedly indicated his understanding of the necessity of an adequate merchant marine, it has so far been impossible, probably because of the many urgent matters which have needed his attention in these times, to formulate an equally clear and effective policy for the merchant marine. As a result there has been, and still is, considerable confusion with respect to what action should be taken in building up a merchant marine.

As long ago as March 13, Secretary of Commerce Roper sent to Congressman S. O. Bland, chairman of the committee on merchant marine, radio and fisheries his recommendations for a merchant marine subsidy program. Congress adjourned without taking action. On March 22 Senator McKellar asked for and received unanimous consent for the publication, as a senate document, of several compilations relating to ocean mail and other forms of government aid to shipping. These papers were prepared by

John Nicolson, formerly director of several bureaus of the shipping board, charged with promotional work in aid of private lines. He was also counsel to the former shipping board committee on legislation.

On Jan. 11 Senator Fletcher of Florida introduced a bill in the senate of the United States amending section 23 of the merchant marine act of 1920. The purpose of this bill was to allow the owner of vessels, documented under the laws of the United States and operated in foreign trade, a deduction in income tax in an amount equivalent to the net earnings of any such vessels during the taxable year provided that these sums be set aside for investment in the building in shipyards of the United States of new vessels of approved type. Also that two-thirds of the cost of any vessel constructed under this provision should be paid for by the owner from funds derived from other sources, and that such vessels shall be documented under the laws of the United States. This bill was approved by the secretary of commerce, but was strongly opposed by the treasury department.

As late as June 20 the secretary of commerce announced the appointment of an inter-departmental committee to study, in co-operation with nationally known shipping authorities, broad questions relating to government shipping problems. A report from this committee is to be available by early fall. The President has approved the program and the personnel of the committee. It is now the plan to present to congress, when it again meets on Jan. 1, a definite clear-cut merchant marine policy which will have for its objective effective support for our merchant marine and practical encouragement for the replacement of obsolescent vessels and the addition of new vessels of the most modern and efficient type.

If we are to have a merchant marine we must have action based on a carefully formulated policy and to do this we must have aggressive and intelligent leadership. We must look for this leadership to the secretary of commerce.

MARINE BOILERS,

Construction Under Proposed Rules

PART II*

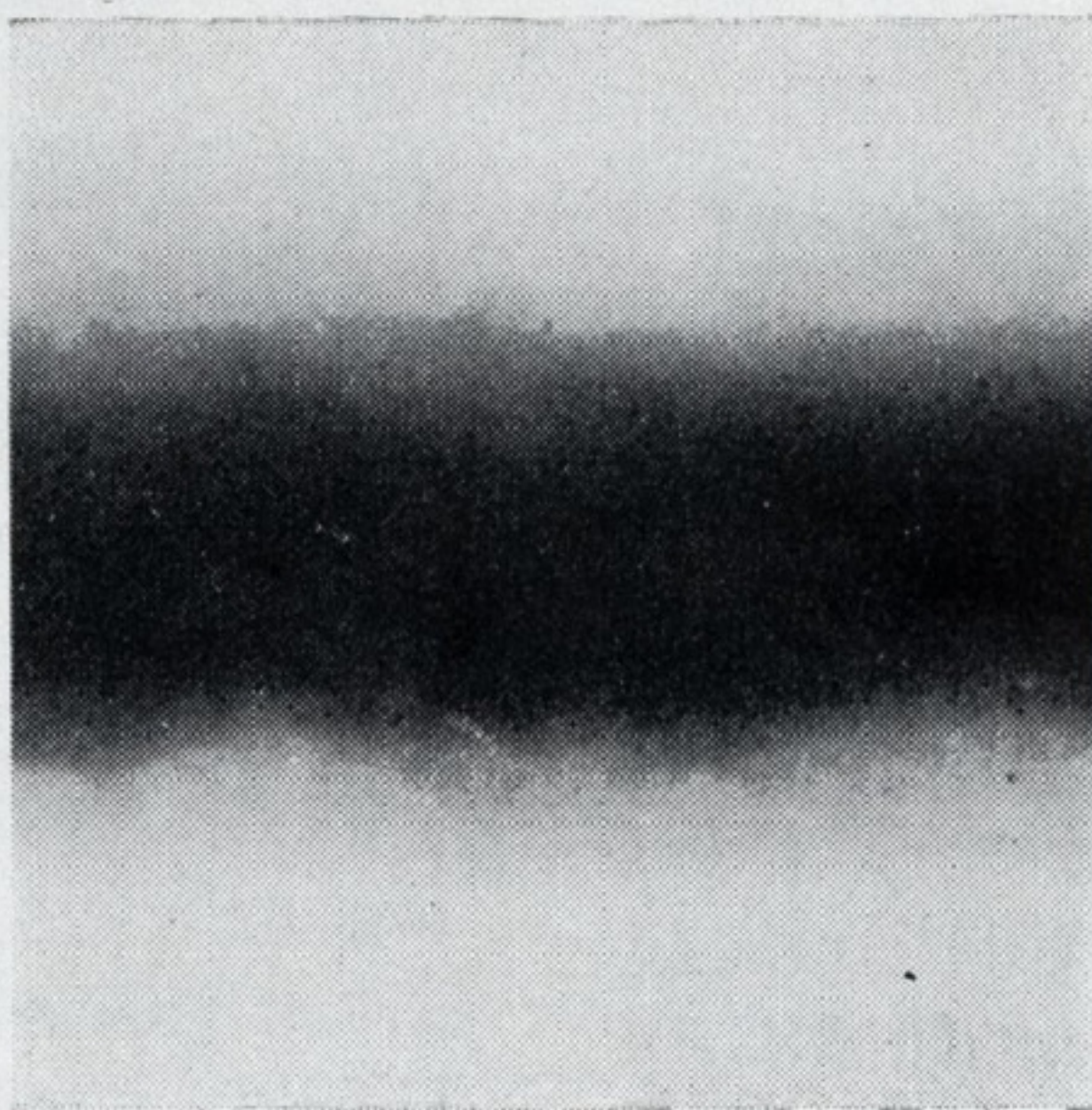
AFTER welding, completed drums are prepared for X-ray examination, which is the most important nondestructive test and was adopted because it provides a ready means of locating defects. Such examination gives both trained and untrained observers an easily interpreted and permanent record of the condition of the weld. In the preparation of drums for X-ray examination the first step is to secure lead markers to the drums alongside each seam. The exact location of each section explored by the X-ray is thus identified by the numbers that are printed on the film. The inside of the drum is also marked off in suitable lengths to facilitate the placing of each film in its proper location.

Modern X-Ray Apparatus

The X-ray apparatus consists of 300,000-volt equipment, the most powerful used at present for commercial purposes, and is capable of exploring seams in plate $4\frac{1}{2}$ inches thick on a production basis. The time of exposure depends, of course, upon the thickness of the plate or the weld explored, but some idea of the rate at which exposures may be made can be had from the fact that under usual conditions of focal distance, etc., an X-ray photograph made through plate $2\frac{3}{4}$ inches thick, requires about 20 seconds. The inspection of a drum with $4\frac{1}{8}$ -inch wall thickness, for a mercury boiler, made recently with this equipment, consumed about an hour for a length of two feet of weld, because of the exceptionally thick section of metal. This time included that required to change the films. The films used are generally 10 inches long, so that, in exploring a longitudinal seam of a drum 20 feet long, twenty-four films are used.

In order to check the recording on the film of small defects, "thickness gages," consisting of thin steel strips, each with a $\frac{1}{8}$ -inch hole in the center, are placed on the side of the weld next to the X-ray tube. These strips are of various gages and one

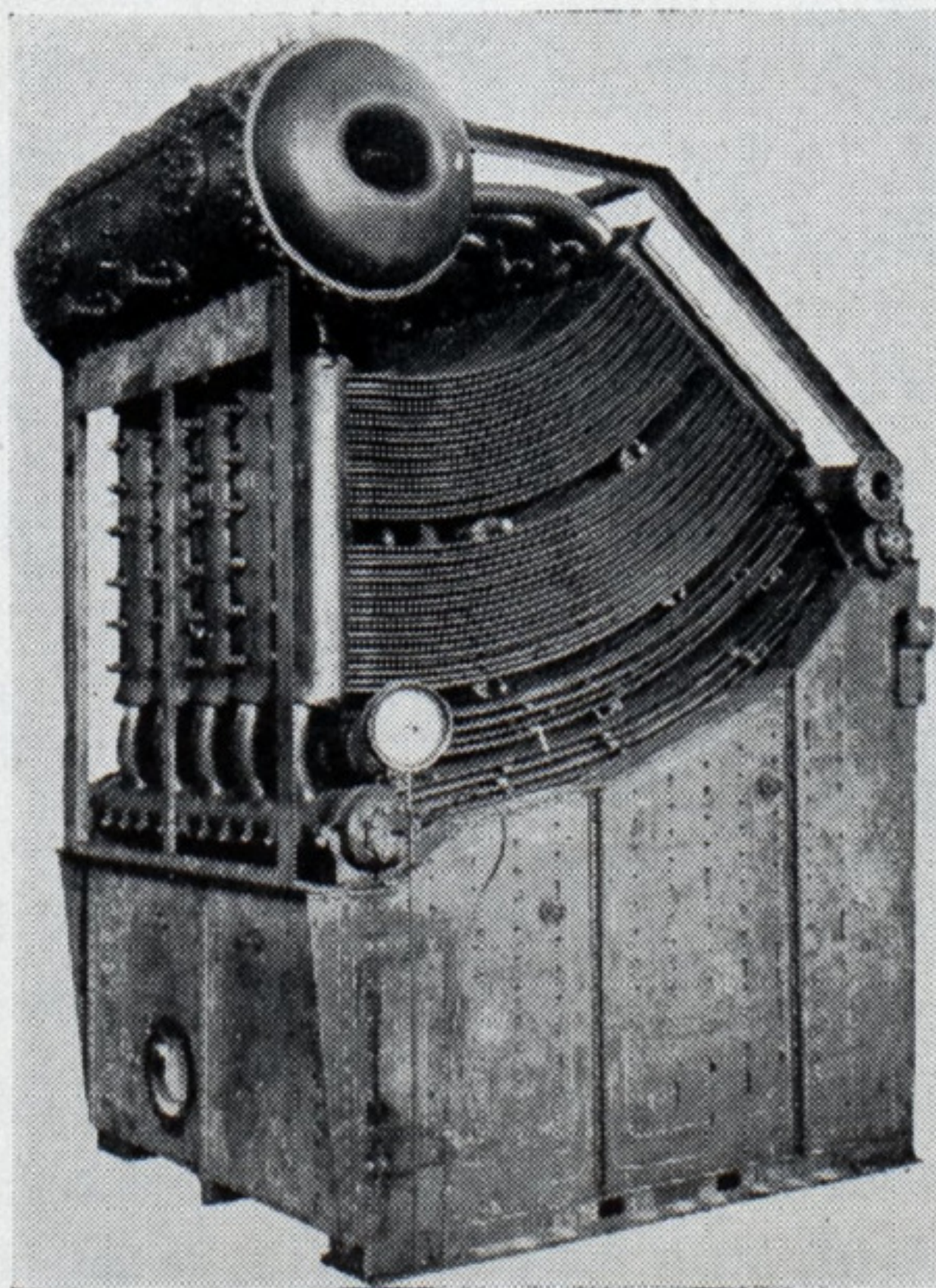
*This article was prepared, at the request of the editor, by the staff of The Babcock & Wilcox Co., and is published in two parts. The first part appeared in the June issue.



Radiograph of sound weld in 1-inch plate. Excess weld metal not removed

is selected that has a thickness of 2 per cent of the total thickness of the plate to be explored. Thus, when the X-ray film is developed, the hole in the thickness gage is recorded as a defect, equal in depth to 2 per cent of the plate thickness. The clarity with which this artificial or simulated defect appears shows how clearly real defects of the same magnitude will appear on the film.

With proper technique in the examination of plates less than 1 inch in thickness, defects as small in depth as 1 per cent of the thickness of the plate can be readily detected.



Annapolis test boiler. Sectional express type marine watertube boiler

For routine examination, however, a sensitivity of 2 per cent is generally considered satisfactory and is the degree specified under the proposed rules for the construction of marine boilers.

Defects of certain sizes have been established as being safe, first by recording such defect on an X-ray film and, later, by testing the welded joint containing the defect for tensile strength and other physical characteristics.

The presence of such defects is easily and positively identified with the thickness gage just described. The location of the defect with respect to the outer and inner surfaces of the seam, however, is not shown. To find the depth of such a defect, so as to facilitate its removal, a triangulation method is used in which the defective section is exposed to the X-ray from two different angles, using the same film. By noting the distance between the two images or two shadows of the defect on the film and comparing this distance with that between the two shadows of a lead marker placed on the outside of the plate, the depth of the defect is easily calculated.

Stress-Relieving Furnace

When the welding has passed the X-ray examination, the drum is placed in a stress-relieving furnace and brought to a temperature suitable for neutralizing any stresses that may have been set up, by the welding process, in the metal in and adjacent to the seams. Small drums may be thus treated in segmental furnaces, with the required number of furnace sections joined together to form a length of furnace sufficient to accommodate the drums to be heated.

Large drums, or several small drums, are heated in a large stress-relieving furnace erected in the shop yard. This furnace is of the car-bottom type, is 60 feet long by 14 feet 6 inches wide, and is 14 feet 6 inches to the spring of the arch. It is fired by 48 natural-gas burners, and is equipped with automatic temperature-control equipment. The multiplicity and arrangement of the burners, together with the furnace lining of light-weight Babcock &

Wilcox insulating firebrick having a low heat-storage capacity, assure a uniform distribution of heat over the entire drum.

The proposed boiler rules state that the drum shall be heated uniformly to at least 1100 degrees Fahr. and that the drum shall be brought slowly up to the specified temperature and held at that temperature for a period of at least one hour per inch of thickness, and then allowed to cool slowly in a still atmosphere. The total time required for the stress-relieving operation thus depends largely upon the thickness of the drum plate, but a drum of average size can be stress-relieved in 6 to 8 hours.

Following the stress-relieving of completed drums, they are subjected to the hydrostatic test required by the rules to which they have been fabricated. The proposed rules for marine service require a test pressure of one and one-half times the working pressure.

Test Plates Defined

The proposed rules also specify that, during the welding process, test plates, secured to the end of the drum at the longitudinal seam, are to be welded together in the same manner as the longitudinal seam. This, of course, is standard practice and has been followed for some time in order to provide means for determining the physical properties of the weld-metal and the welded joint. The test piece is not removed from the drum until after the stress-relieving operation is completed. It is then taken off and, in accordance with the requirements of the proposed rules, machined to the specified forms for tension tests of the joint and the weld-metal, a bend test of the joint, and a specific-gravity determination of the deposited metal.

The procedure followed in fabricating welded drums has been described at some length, because this process as applied to marine boilers is rela-

OFFICIAL adoption of the proposed new rules covering marine boiler construction, now awaiting action by an executive committee of the board of supervising inspectors, is expected in the near future. What effect adoption of the new rules will have on the methods of marine boiler construction is discussed in this article, the first part of which appeared in the June issue.

tively new and is a subject of timely interest, in view of the fact that the use of welded drums probably will soon be authorized for merchant vessels.

In 1930, the United States navy ordered the first boiler drums of fusion-welded construction. Previous to this time there had been carried out, in The Babcock & Wilcox plant alone, a most impressive program of research and experiment. Later, a wealth of experience was gained in

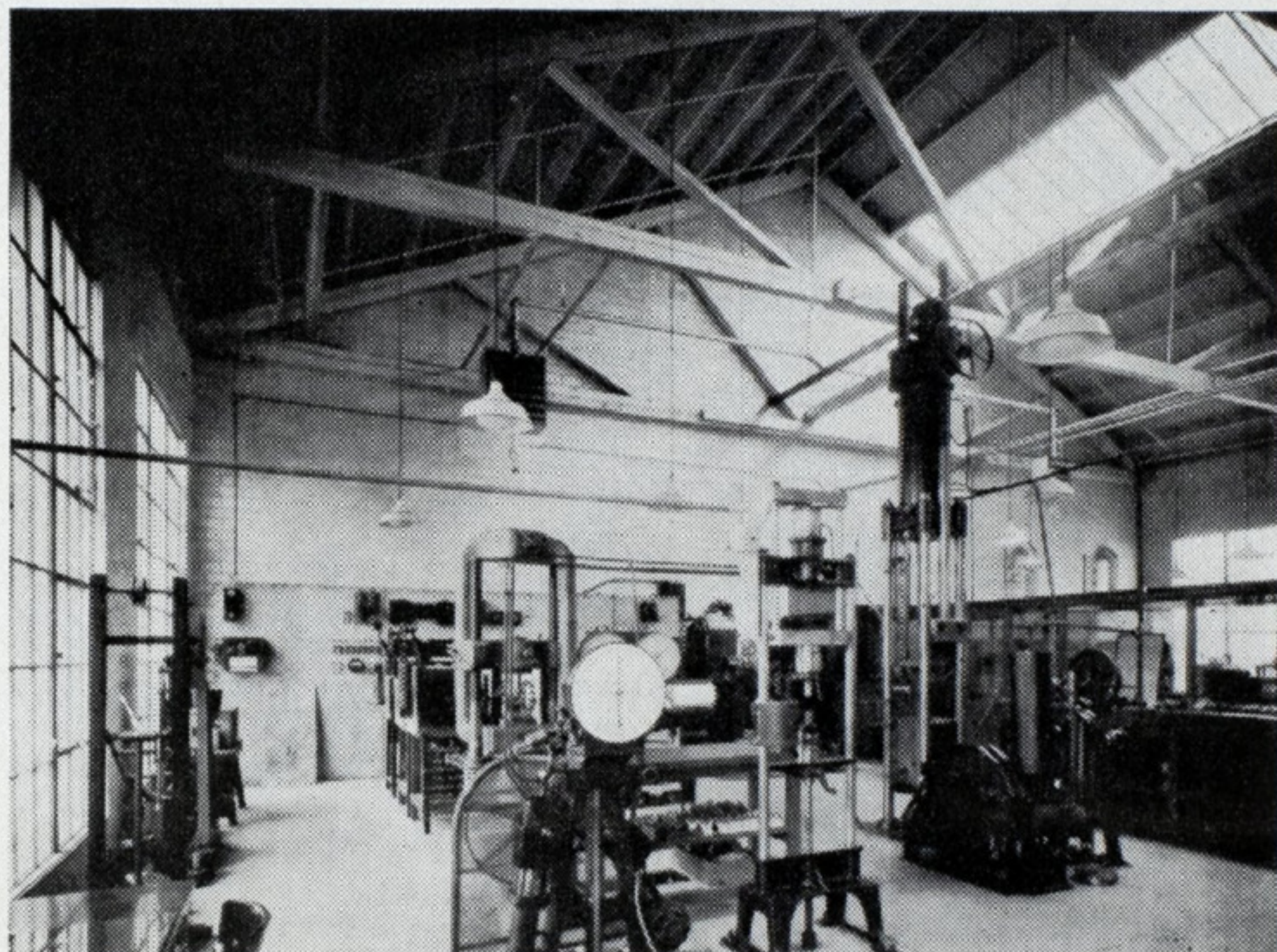
the practical application of welding to boiler drums and pressure vessels for land service. To review these facts even briefly is to realize that fusion-welding has attained a new status and may be accepted by shipowners and operators as a modern construction that has been definitely proved to be safe and reliable, and one that results in the production of drums that are lighter in weight and less liable to destruction by caustic embrittlement than are riveted drums.

Several Welding Processes

The foregoing remarks on welding apply to the use of the metal-arc process only, but this company employs, for various special purposes, almost every welding process except the forge-and-hammer method, which it discarded in favor of other methods at the time of making an investigation of welding processes. To be more specific, the list of methods used includes, besides the metal-arc process, gas welding, thermit welding, atomic-hydrogen welding, carbon-arc welding, and both "flash" and "butt" types of resistance welding.

In this connection, it may be of interest to note that in the development of its flash-welding process, the

Physical testing laboratory fitted with modern equipment for tensile, compression and impact testing, also for heat treating



The general analytical laboratory. One of the important factors in the control of the quality of materials used in boiler construction



company's engineers joined together by this process, two lengths of 14-inch outside diameter pipe with 1 5/16-inch walls. The cross-sectional area of the metal of this welded pipe is 89 times that of a 1-inch outside diameter tube, 1/4-inch thick, an illustration of the tremendous strides made in the development of this process with respect to the size of the pipes that can be joined in this manner.

Joining, by the flash-welding process, lengths of tubes for superheaters, economizers, and similar equipment is now common practice. In some cases, in the fabrication of superheaters, particularly for boiler

units that are to deliver highly superheated steam alloy tubes are joined to carbon steel tubes by this process, with the high-temperature-resisting alloy material in the hottest zones. This welding together of dissimilar metals is an example of how the art as practiced in this shop has gone considerably beyond the welding of boiler-plate steel. Furthermore, chrome-nickel alloys of various analyses, as well as chromium-clad steel, nickel-clad steel, and other materials, have been successfully welded.

The trend towards the use of high steam temperatures and high furnace temperatures, especially in land boilers, has given impetus to the

of a modern public-utility system.

There are nine melting furnaces, ranging in capacity from 100 to 3600 pounds. The alloy foundry is also equipped with testing apparatus for checking and controlling the quality of the sand used in the molds; automatically-regulated core-baking ovens, hydraulic testing equipment capable of exerting pressures up to 6000 pounds per square inch, and a centrifugal pipecasting machine that can produce cylinders up to 11 inches in diameter and 10 feet long.

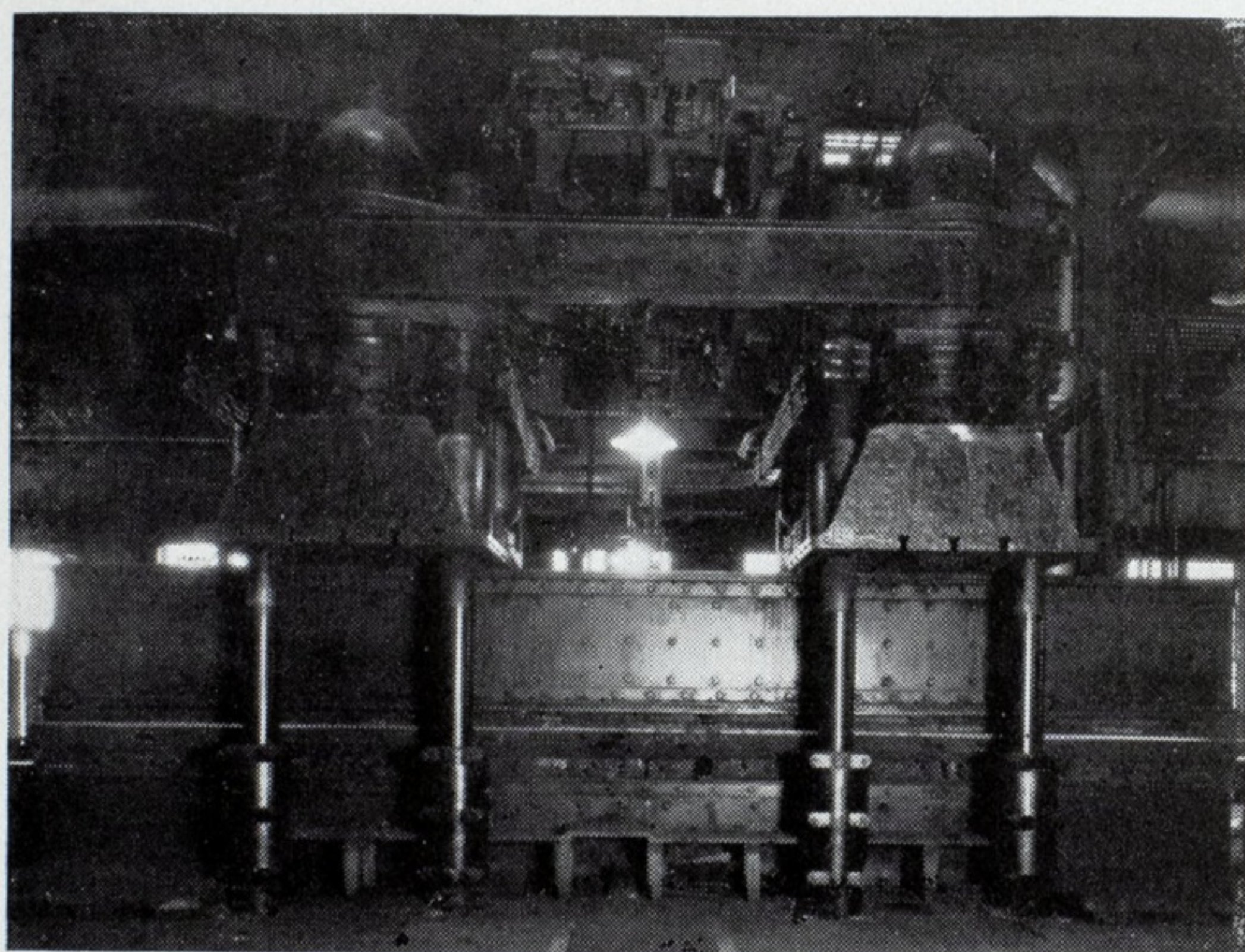
The diversity of the work done in a modern boilershop is further illustrated by such products of the shop under consideration as forgings weighing 3500 pounds each and oil-

ery. In contrast to this operation, the sprayer plates of oil burners are drilled and milled to plus or minus 0.0005-inch and handhole plates and handholes are machined to similarly close tolerances.

The visitor to this plant, therefore, views in succession work of the heaviest kind being done in the forge shop, and work of a most precise nature being performed in another department. Another contrast in the nature of work performed is that which exists between those parts made especially for each boiler and other parts that are highly standardized. Thus one sees, on the one hand, a drum being fabricated as a separate and individual part for a specific boiler and, on the other hand, stoker links, water-wall blocks, inspection doors, and many other parts being produced on a quantity basis by the latest mass-production methods.

The fabrication of casings is one operation of the business that is special, in the sense that each casing is made for a specific boiler but is standardized to the extent that certain operations are performed on machines either built for, or adjusted to, the work to be done, and certain standard-size panels are made which, with other special sizes, are assembled to comprise a complete casing of special overall dimensions and shape.

Perhaps the most important consideration in the production of cas-

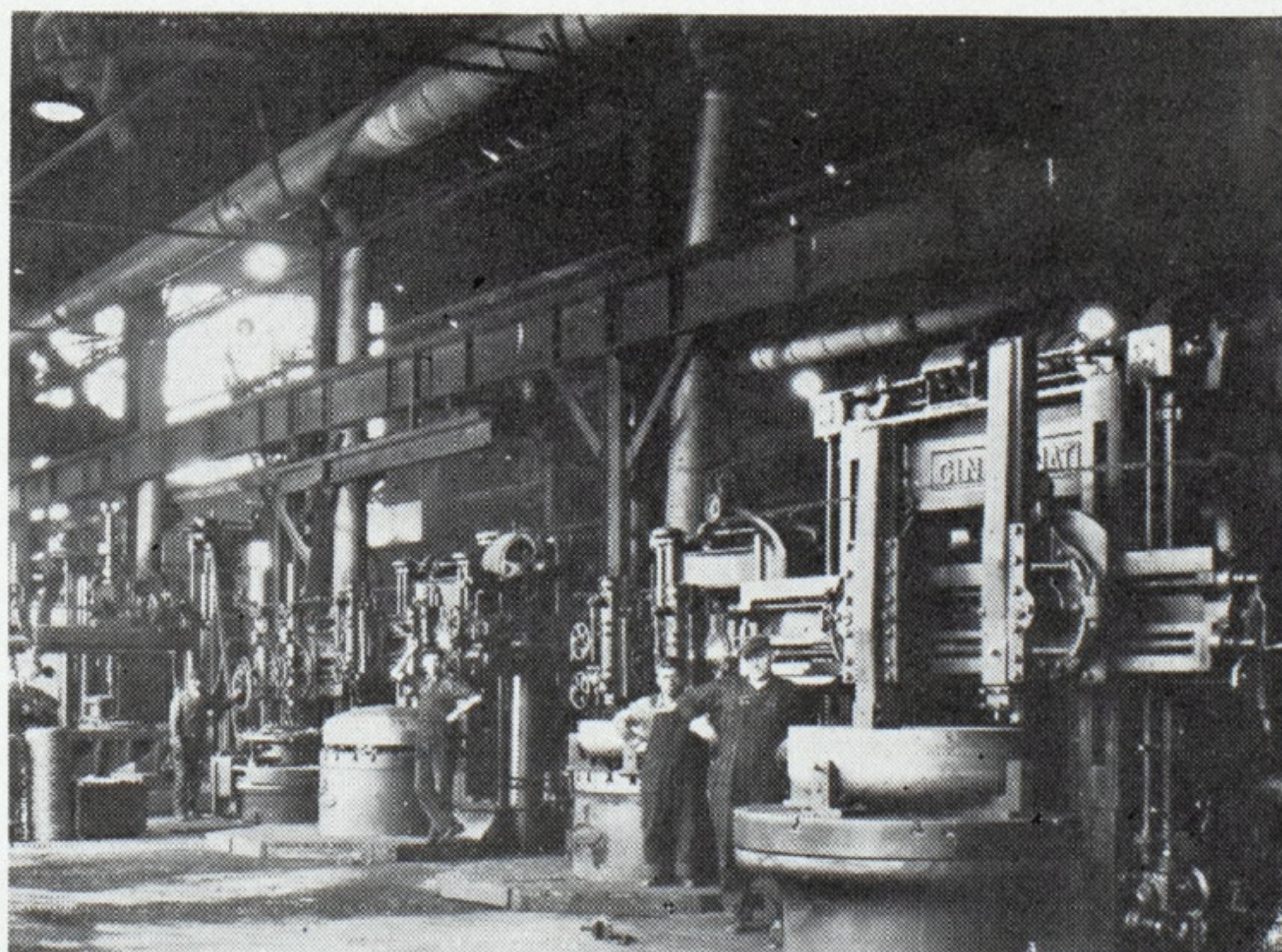


Side view of 2600-ton twin press used in forming heavier drum plates for boilers and pressure vessels

study of welding alloys such as those mentioned, and has also led to the wider use of alloy castings for service at high temperatures. This is a matter that is relatively unimportant as it now applies to marine service, but the steadily mounting temperature of steam used in marine propulsion presages a wider use of alloy materials in the future. It is, therefore, appropriate for us to spend a few moments in the alloy foundry while on our trip through this plant.

The alloy foundry is interesting, not only because its products may soon be important parts of the marine boiler of the near future, but because it furnishes such an apt illustration of the tremendous change that has taken place during the past decade or two in the art of boiler making and in the equipment found in a modern boilershop. This department, in fact, has little resemblance to the popular conception of a foundry. All heats are taken from high-frequency electric-induction furnaces supplied with energy from one 150 kilowatts, 2040-cycle generator and one 1250 kilowatts, 960-cycle generator installed in a room that resembles, in general appearance, an up-to-date substation

A battery of vertical boring mills in the forge shop at the plant of the Babcock & Wilcox Co. For machining drum heads and manhole covers



burner sprayer plates weighing but a fraction of an ounce each and having machined tolerances of a nature so close as to have been practically unknown in the art as practiced only a comparatively few years ago in boiler plants. In the forge shop of this establishment, nozzles ranging in size from the smallest in general use to those 24 inches in diameter are made, and drum heads as large in diameter as 60 inches are flanged and dished by specially designed hydraulic machin-

ings is that of air tightness, especially for boilers that are to be operated with forced draft. The initial steps in the fabrication of an air-tight casing consists of shearing the sheets to size, followed by removal of the corners by coping. The plates are then put in a bending brake and flanged, after which the flanges are welded together at the corners. The joining of the flanges by welding, combined with accuracy in bending and forming,

(Continued on Page 40)

Giant Cunarder Anchor Chain Electric Welded

By Capt. J. G. Bisset

THE world's greatest and fastest liner, until now known by her job number of 534, is to be launched on Sept. 26 by Her Majesty, the Queen, and will be named BRITANNIA.

Unlike the three mammoth liners, LEVIATHAN, MAJESTIC and BERENGARIA, which carry a stem, or center anchor weighing 14 tons and two bower anchors weighing $8\frac{1}{2}$ tons each, the BRITANNIA will carry only two bower anchors weighing 16 tons each. The main reason for this is that the stem of the BRITANNIA will be of full, rounded form so that should the cable lead across the stem, it will not be subjected to any more of a nip than it would when leading aft from a well designed hawse-pipe.

In the three ships above mentioned, the stems are sharp and center hawse-pipes are necessary. This meant that the stem anchor was in constant use while the bower anchors were looked upon merely as supplementary.

The 16-ton anchors of the BRITANNIA will each have 165 fathoms of cable attached. These cables are being manufactured by Samuel Taylor & Sons

Ltd. of Brierley Hill, Staffordshire, England, under a special process known as "Tayco."

They are made of 31 to 35 tons tensile steel and will have a total weight of 145 tons. The links are $4\frac{1}{8}$ inches in diameter, and each cable will be tested to a tensile strain of 289.4 tons. In addition to this, a three link piece will be taken from each 15-fathom length and tested to the breaking strain of 405.1 tons. The raw material (Siemens-Martin steel) for each link takes the form of two forgings, and these together form one link, with a stud that is an integral portion of the link.

The links are made with a joint across the middle of the stud, and are forged with this joint sufficiently open for threading. After threading, the joint is closed and the two flat faces thus formed are welded together in an electric forge. Each link can be bent double when cold, without showing signs of fracture.

Our illustration shows a three link piece being subjected to a destruction test, and some idea of the perfec-

tion to which electric welding has been brought, is attained from the fact that the cable fractured under a 693.4 tons load, and not in the weld, but in the original solid material.

Lloyd's tensile strain for $4\frac{1}{8}$ -inch diameter *hand* welded chain cable made from *iron*, is 206.7 tons, and the breaking strain on a three link sample piece is 289.4 tons.

From the foregoing it will be realized that the anchoring arrangements of the BRITANNIA will leave nothing to chance, and will, for a season at least, be the most powerful afloat.

Cunard-White Star Merger

Chairman of the Cunard line, Sir Percy Bates, has been elected chairman of the board of the newly organized Cunard-White Star Ltd. He has been a member of the board of directors of the Cunard line since 1900.

S. J. Lister, general manager and a director of the Cunard line, and A. B. Cauty, general manager of the White Star line, have been appointed co-managers of the Cunard-White Star Ltd.

Consummation of the merger of the two steamship companies will actually occur July 2, when the activities of the White Star line offices and ships will be transferred to the Cunard offices at 25 Broadway, New York, and Piers 53, 54 and 56, North river.

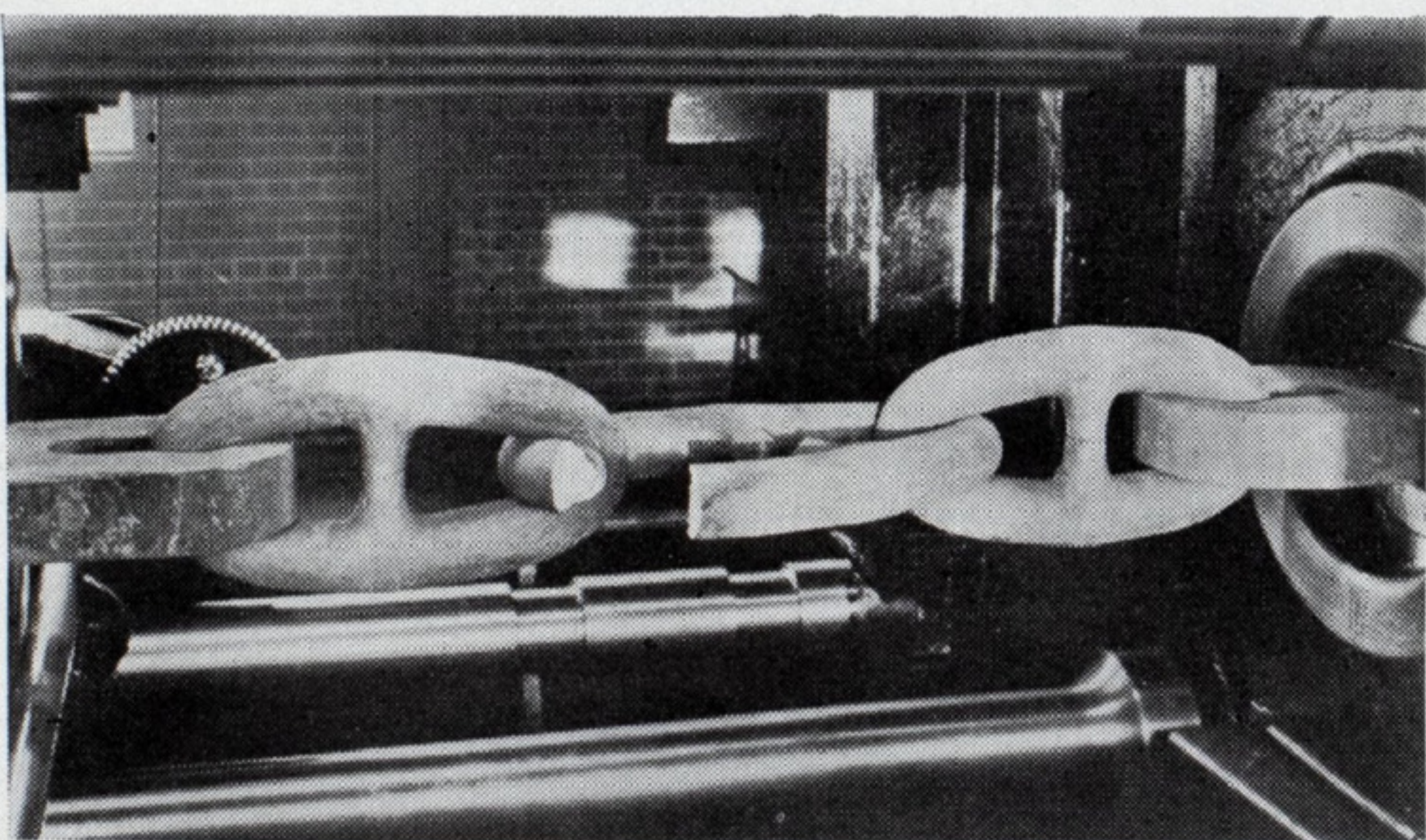
Long Distance Towing

The tug SUSAN A. MORAN of the Moran Towing & Transportation Co., 17 Battery place, New York, recently completed another long distance towing job, having brought the huge dredge INDIANA of the Great Lakes Dredge & Dock Co. from Cristobal, C. Z., to Montreal, a distance of 3771 miles. The tow was made in 31 days, 12 hours and 30 minutes, arriving in Montreal May 30. The INDIANA proceeded from Montreal, through the canals and lakes, to Detroit.

The SUSAN A. MORAN, on her return, will tow the tugs BATHALUM and BAYMEAD from Montreal to New York to be reconditioned. These two tugs will then leave New York under their own power for Vladivostock via the Panama canal and San Francisco, the Soviet government having acquired them from the Ford Motor Co.

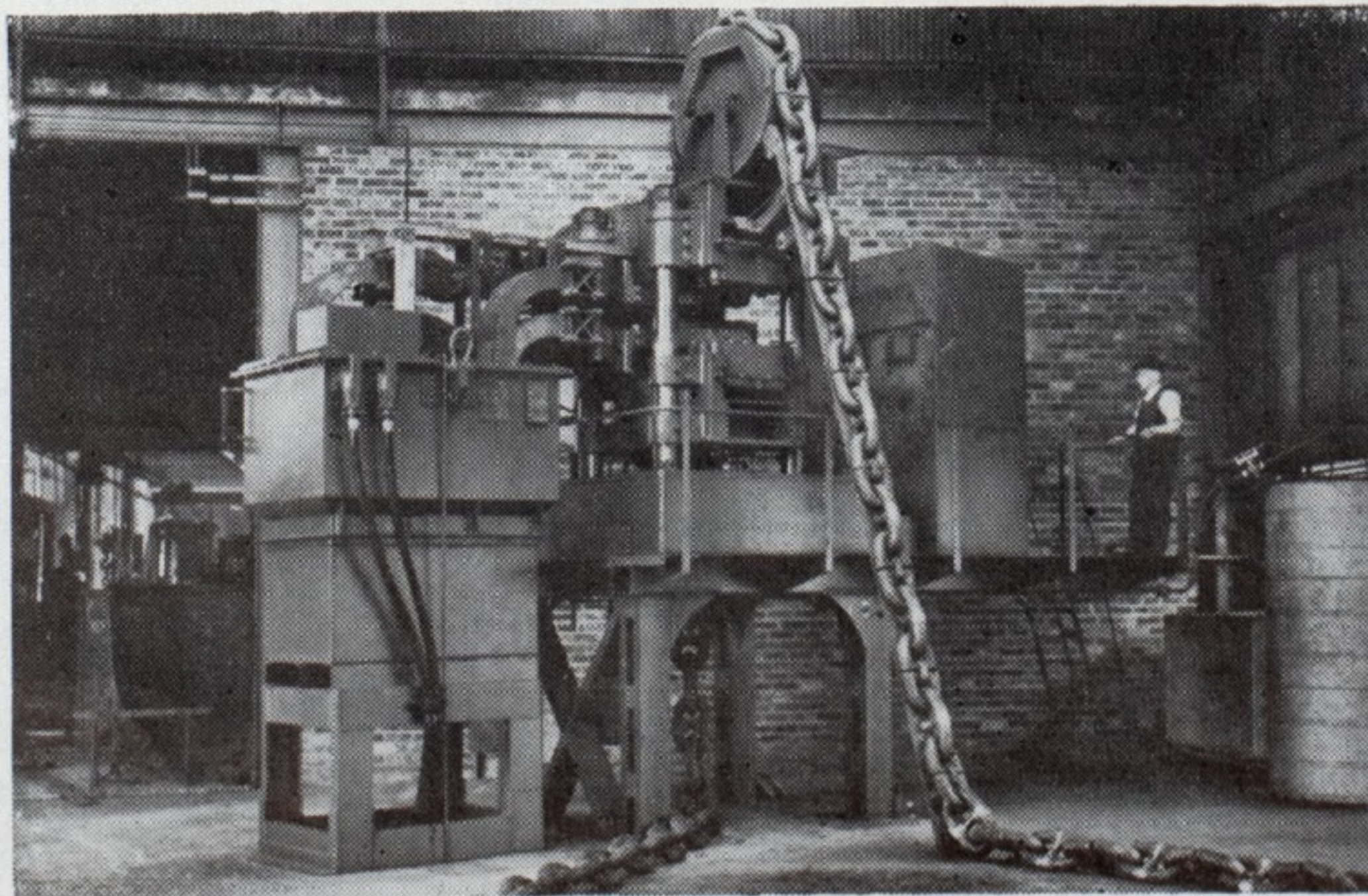
Arthur M. Tode, national president of the Propeller Club of the United States, announced the formation of the Providence, R. I., Propeller club, on May 21.

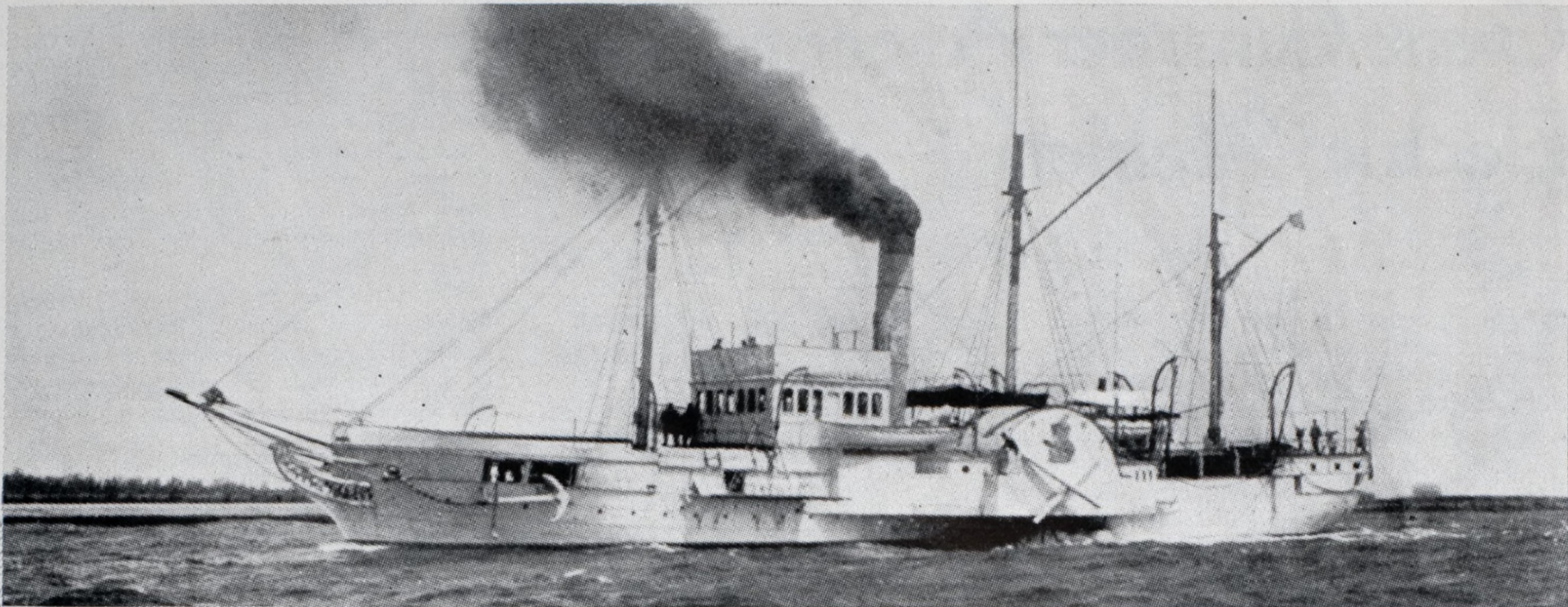
The officers to serve until July 1, 1935, are as follows: president, James F. Moran. Goff & Page Co.; vice president, Harold J. O'Brien. Standard Oil Co.; secretary, James F. Rawdon, United States steamboat inspection service; and treasurer, John J. Orr.



Destruction test on $4\frac{1}{8}$ -inch diameter stud link chain cable. Fractured at 693.4 tons load. From chain similar to that for the new giant liner Britannia

Three-inch diameter stud link chain cable going through the welding machine at Samuel Taylor & Sons Ltd., England. When tested to destruction, broke at 372.9 tons load





The Wolverine as she looked in 1923 when making her last voyage on the Great Lakes

WOLVERINE,

First Iron Ship of the American Navy

BY DANA T. BOWEN

THIRTY years after Commodore Oliver Hazard Perry's famous battle of Lake Erie, in which the historic NIAGARA took so prominent a part, there was launched at Erie, Pa., the U. S. S. MICHIGAN, now the WOLVERINE. Those thirty years covered what is probably the era of the most revolutionary transition from old to new in ship construction, the NIAGARA representing the wooden ship of sailing days, and the MICHIGAN the modern steamer.

Through the treaty of Ghent in 1814 and the subsequent Rush-Bagot agreement of 1817, it was permissible for the United States and Canada each to build and operate on the Great Lakes one 600-ton armed ship. Canada never took advantage of this privilege, but in 1841 and 1842 the United States ordered plans drawn for the paddle wheel, bark rigged steamer MICHIGAN. The hull was designed by Naval Constructor Samuel Hart, U. S. N., and the engines and boilers by C. W. Copeland. Both engines and boilers were built by Stackhouse & Tomlinson, then of Pittsburgh.

First Iron Ship on Lakes

In 1843 the actual work of constructing the ship was started in Pittsburgh. The plates, frames and other iron parts were prepared there ready for assembling and then were transported laboriously most likely by oxen teams, overland to Erie, as the railroad was not yet available. At the foot of

French street the work of assembling the ship was begun. The plates, of charcoal iron about three-eighths of an inch thick, were presumably beaten into shape with wooden mauls in a bed of sand. Three heavy box keelsons run the length of the ship, while two shorter keelsons form the foundation for the engine frame.

The MICHIGAN was the first iron ship of the United States navy and also the first iron ship to sail the waters of the Great Lakes. Even today the plates show little of the ravages of water, wind and weather, and it is stated that the ship never developed any structural weakness despite the fact that she has experienced many a hard Great Lakes gale.

An iron ship in those days was a radically new departure steam propulsion was hardly less so. Various crude forms of steam engines had been tried and in the MICHIGAN there was placed the very latest type of engine then developed. These were two inclined direct acting condensing engines, placed side by side, the cylinders being 36 inches in diameter with an 8 foot stroke. Oddly enough these same engines still rest in the ship. They were used continuously during the 80 years that she sailed, and finally carried her to her home port at the end. With some repairs they could still be used. Her two original iron boilers lasted nearly 50 years, having been replaced during the winter of 1892 and 1893. Wood served as fuel until coal became

more readily available. In her early career the MICHIGAN also carried sails as a means of propulsion.

Laid Down at Erie

During 1843 the MICHIGAN was launched into the waters of Erie bay was completed and outfitted the following year. An odd and interesting event is associated with her launching. Many curious spectators gathered to see the new iron ship take to the waters and doubt as to her ability to float was prevalent. As the vessel started down the ways to the water, she became stuck and could not be budged. The spectators eventually left the scene and the story has it, that, during the night she launched herself, and was found floating proudly in the bay the next morning.

The MICHIGAN was placed in commission Aug. 9, 1843 and made her first Great Lakes cruise 1844 under command of William P. Inman, who sailed her until Oct. 24, 1845. Her command was then taken by Capt. Stephen Champlin, who it is reported, was a cousin of Oliver Hazard Perry, and who commanded one of Perry's vessels, the SCORPION, in the battle of Lake Erie. Captain Champlin sailed the MICHIGAN for three years, after which followed a list of 37 commanders, the last being Lieut. Commander William L. Morrison of Erie, Pa.

Among the outstanding details of the ship are: length, 168 feet; beam, 27 feet; draft, 10 feet; and displace-

ment, 600 tons. Her wooden paddles are mounted on two 20-foot diameter wheels which are propelled by the engines previously described. The MICHIGAN has carried various armament, replacing same as it was invented and improved.

Her upper works have been changed since her launching, the cabins and deck houses being rebuilt to suit the work which she did at that time. As the ship stands today, the forward main deck is mostly clear. A large pilot house was built to serve the double purpose of navigating and chart preparing. A roomy bridge above was covered with awnings. Bridges extend over the paddle boxes amidships.

Captain's Cabin Aft

The captain's cabin is aft on the main deck, true to the traditions of sailing ship days, and is today in excellent condition. It consists of a roomy lounge with table, desk and library, two staterooms and bath, all paneled in rich dark woodwork. The aft part of the ship was known to her sailors as "the holy of holies" as only the highest ranking officers were permitted in these quarters. She carried 106 men in her full crew.

Her career, in spite of her guns, has been peaceful. Only two events were particularly colorful. The first, just prior to the Civil war, was when she broke up a religious sect that was formed and flourished for a while on the Beaver islands in Lake Michigan,

ship for treatment by the ship's doctor. His abdomen had been accidentally chopped open, so that the digestive operations could be plainly observed. The doctor, realizing the phenomenon, had him brought aboard ship and transported him to Mackinac island, where studies were made of his digestive processes by the army surgeon stationed there. It is said the patient recovered to find a glass plate in his abdomen, whence science continued its quest for knowledge. The island where the woodman was found, was named for him, Saint Martin, island, and still carries this name.

The ship was used mostly in survey work and in training recruits in naval work. Many of the modern Great Lakes charts are due to the work done aboard the MICHIGAN.

On June 21, 1905 her name was changed to WOLVERINE because of the naming of a new battleship, the MICHIGAN. The old iron ship of the lakes then took the nickname of the state whose name she had previously carried.

Centennial of Perry's Victory

During the centennial celebration of Perry's victory in the battle of Lake Erie, in the months of July, August and September, 1913, the WOLVERINE made a cruise to Fairport, Cleveland, Sandusky, Put in Bay, Monroe, Toledo, Detroit, Green Bay, Milwaukee, Chicago and Buffalo in which she towed Perry's famous ship the NIAGARA, which had been raised and rebuilt.

Hundreds of thousands viewed the two vessels in their parade of peace and goodwill up and down the Great Lakes. Giant celebrations were given the ships and crews at the ports of call and much interest was directed toward historical and nautical affairs of the Great Lakes.

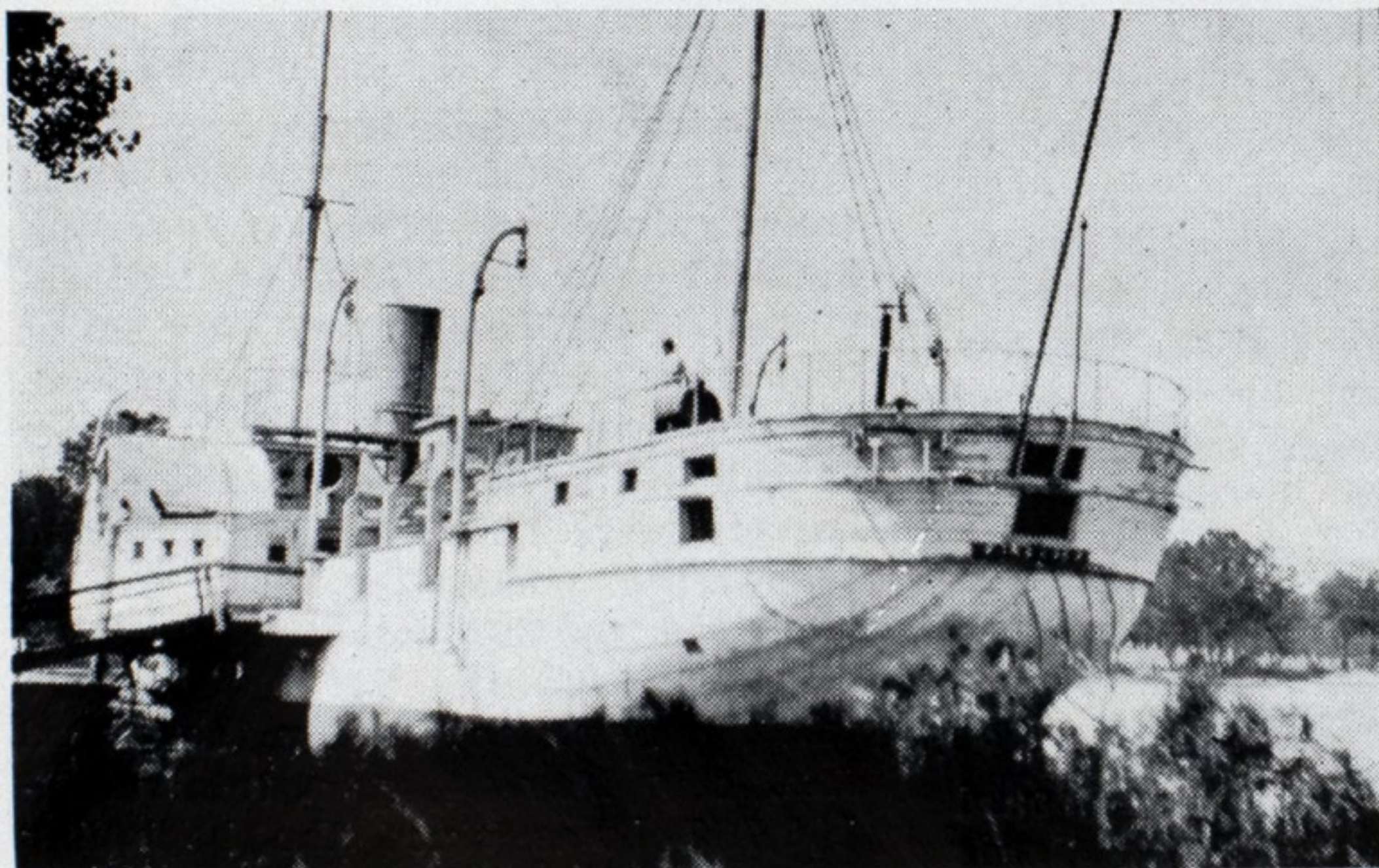
During the World war the WOLVERINE again became active as a training ship and many a sailor recruit said goodbye to his city's sky line from the decks of this old ship.

Her Final Voyage

But all careers must sometime end, and the old WOLVERINE was no exception. On Aug. 12, 1923 while she was returning from a training cruise and steaming through the Straits of Mackinac, she had the misfortune to break a connecting rod on her port engine. Temporary repairs were at once made and it was found she could run under her own power at less than five miles per hour, so she continued on her run to Erie at this slow speed. The fates were still against the old ship, as during that night a strong summer gale blew up on Lake Huron, and the badly crippled WOLVERINE was forced to shelter at Harbor Beach until the next noon. After a slow and trying cruise the grand old ship sailed triumphantly into Erie harbor, unassisted, and docked at the Public pier. Her sailing days were over, as funds were not available to repair her damage and she lay idly floating at her dock for five years.

Her friends however watched her fondly and with regret noted how time was devastating what man had built. Realizing her probable fate would be to sink at her pier and be salvaged as junk, as a menace to the navigation she was built to protect, two old friends, one her last commander, William L. Morrison, and another Erie sailor, Capt. P. J. Grant, took it upon themselves and arranged to have her towed to her present anchorage at Crystal point in Misery bay. This was done with the aid of tugs on Nov. 23, 1928. How the shades of her former commanders and crews must have cheered as these two conscientious sailors worked to protect the old ship. In her latest berth she is under the

(Continued on Page 40)

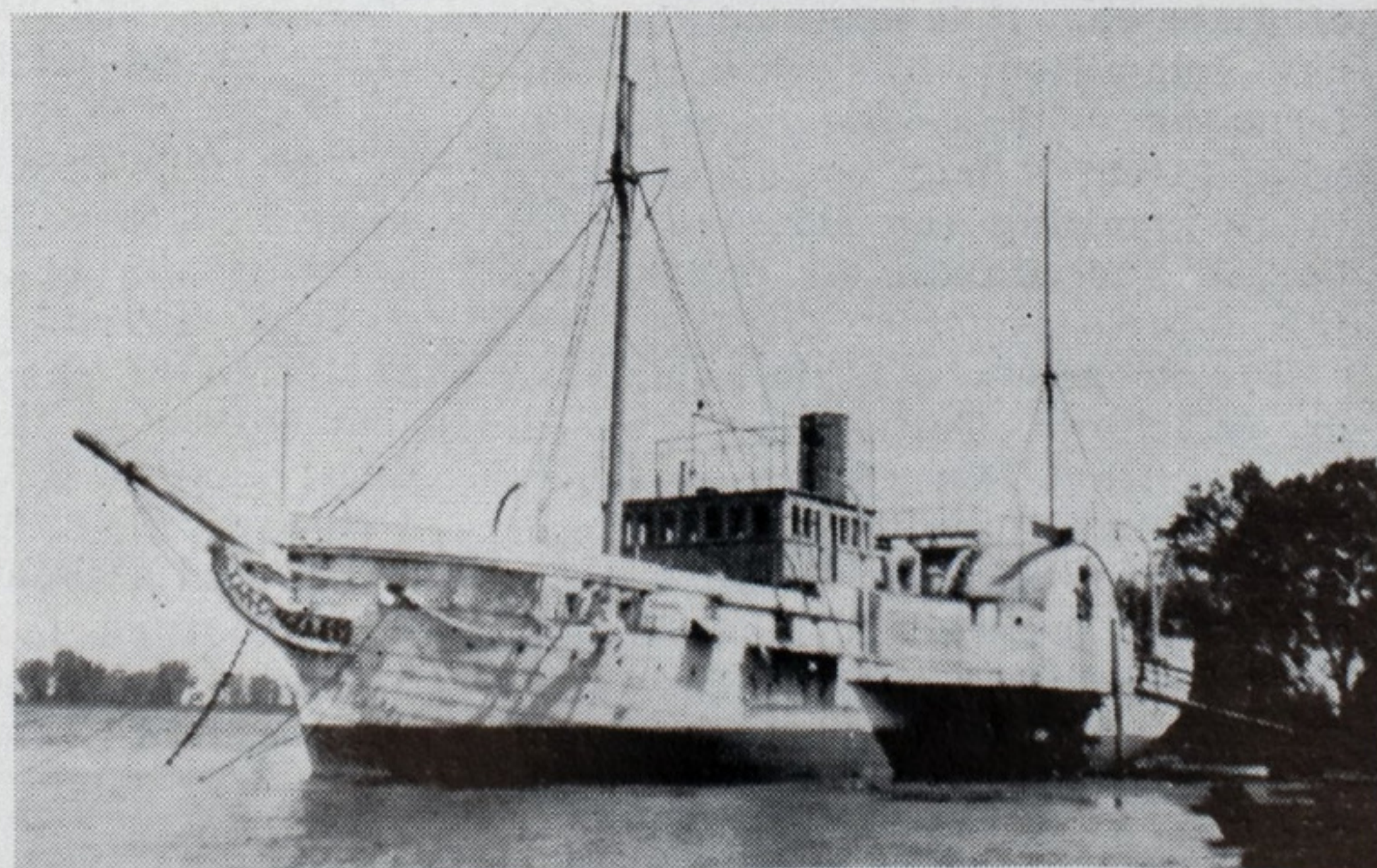


As the Wolverine looks today at her anchorage at Crystal Point, Misery Bay, Erie, Pa. Her iron hull is still sound

and which had become unpopular with the government. The MICHIGAN disbanded the sect and caused the arrest of its leaders. The second event was during the Civil war, while guarding a prison camp on Johnson's island in Sandusky bay. History records how a rebel plot to board her and turn her into a raider was blocked by the alertness of her officers.

It is also claimed she was instrumental in giving to the medical world a living specimen of exposed human digestion. The MICHIGAN was cruising among the Les Cheneaux islands, when, at a port of call, a French Canadian woodman was brought to the

The Wolverine is now under the charge of the Presque Isle State Park commission, and belongs to the State of Pennsylvania



Name Committee to Study Shipping Problems

The organization of an inter-departmental committee to study in co-operation with nationally-known shipping authorities broad questions relating to government shipping policy was announced on June 20 by Daniel C. Roper, secretary of commerce.

This is in conformity with the recommendation of a cabinet sub-committee which has been studying the shipping code. The study of the proposed code revealed the necessity for a study of the entire merchant marine and shipping policy for the government, including the shipping code. This study will be pursued this summer in order to have the report available by early fall. President Roosevelt approved of the program and of the personnel of the committee selected by Secretary Roper.

Without defining the complete scope of the committee's studies, the secretary recommended that it give its consideration to the administration's future policy in the development of a strong merchant marine. This topic will involve such issues as the question of subsidies, consolidation of shipping lines in the interest of establishing our merchant marine on a more self-sustaining basis, the plans to be followed in disposing of water craft which is in excess of present needs, and plans for sound financing for new craft under the Jones-White act.

In line with the secretary's recommendation, the committee will also confer with the war and navy departments with regard to the former department's army transport procedure and the vessels of the navy which are now laid up. In addition, the objectives of the proposed shipping code, its application and relation to the shipping board bureau, will also be considered.

At the present time, the shipping board bureau is analyzing the testimony secured by the senate committee to investigate air and ocean mail contracts under Senator Black of Alabama. It is expected that the new committee will review this information with a view to seeing to what extent it may be of assistance in reorganizing the shipping board bureau and shaping its policies for the future.

The members of this committee are as follows: Turner Battle, executive assistant to secretary of labor; Harllee Branch, second assistant post master general; L. R. Edminster, agricultural adjustment administration; Henry H. Heimann, chairman, sub-committee on shipping board of business advisory and planning council; Thomas Hewes, special assistant

to secretary of state; South Trimble Jr., solicitor, department of commerce; J. B. Weaver, national recovery administration. South Trimble Jr. was elected chairman of the committee.

Record Passenger List

When the Italian liner REX sailed from New York on June 23, she carried a record passenger list of a total of 1920 in all classes. It is believed by officials of the Italian line that this is an indication of a return to the heavy tourist business of the years before the depression, along with a return to better business in general.

This large passenger list of the REX, which set a record for the year 1933 and so far in 1934 for all ships entering or leaving New York, is but one of many capacity bookings of the early summer tourist season, not only for the Italian, but also for other leading steamship lines.

Following the sailing of the REX, the SATURNIA, ROMA, CONTE DI SAVOIA and the VULCANIA of the Italian line will sail with every cabin occupied.

The tourist rush eastbound, which will continue until the end of July, will be followed by a similar westbound rush lasting from the middle of August until late September. If the bookings of the Italian line are a criterion this promises to be the biggest tourist season since 1929.

In her sailing on June 23, accommodations on the REX in all classes were filled, as follows: 366 first, 325 special; 478 tourist and 759 in third class. This is the first time since 1929 that the Italian line has had the bookings on eastbound steamers in all classes, except third, closed two weeks before sailing dates.

Election of Officers

At the annual meeting of the board of directors of the Todd Shipyards Corp., held at its offices, 25 Broadway, New York city on June 21, John D. Reilly was again elected president of the corporation.

The following officers were re-elected: George Dawe, executive vice president, in charge of operations; J. Herbert Todd, vice president and chairman of the executive committee; George G. Raymond, vice president; Sanford S. Cox, secretary and treasurer; E. P. Enfer, assistant secretary and assistant treasurer.

In addition to the above officers Clarence W. Wiley, president of Todd Drydocks Inc., Seattle, was appointed vice president of the parent corporation.

President Returns Code Without Signature

The general shipping code after final revision received the approval of Administrator Johnson and was sent by him to the President. The President, however, returned the code without his approval, and with comment attached from other departments of the government.

General Johnson at once announced that he would try to iron out the difficulties promptly because he felt that a general shipping code is very necessary, especially at the present time, as it might help in settling the labor troubles which have disturbed the industry during the last several weeks.

It is now believed that objection to the code among groups of shipping men has been largely overcome, and that it will ultimately be approved when the objections of various other government departments have been satisfied.

Houston Traffic Up

While the tonnage passing through the port of Houston, Tex., during the month of May was slightly less than in April, due principally to the unsettled condition of the labor situation and stevedore strike, the record of 1,413,793 tons valued at \$27,393,595 made a very satisfactory showing when compared with previous years.

For the period from Jan. 1 to May 31, a total of 7,582,808 short tons valued at \$161,331,801 was handled over Houston terminal facilities. Oil constitutes the major item of export. Crude, fuel, gas oil, gasoline, kerosene and various grades of lubricating oils in thousands of barrels were shipped coastwise and to foreign ports.

Cotton to the extent of 797,120 bales went to the ports of Europe and the Far East during the period Jan. 1 to May 31, or a total of 2,160,708 bales since the beginning of the season Aug. 1, 1933.

Scrap iron, from stove lifters to locomotives, has been handled by the shipload to such ports as Bremen, Hamburg, Rotterdam, Havre, Barcelona, Gdynia, Yokohama, Kobe, Shanghai, and to our own North Atlantic ports. A total of 83,702 tons was loaded from Jan. 1 to May 31.

The U. S. Engineer office at Louisville, Ky., will receive bids until July 24 for furnishing one 1600 horsepower diesel engine for dredge pump. Further information will be supplied prospective bidders by application to the United States engineer office at Louisville, Ky.

FEED WATER TREATMENT

for Boilers on Great Lakes Vessels

BY N. B. GRAHAM

THE problem of boiler water scale is one with which every engineer is familiar. The loss due directly to the insulating properties of the scale alone amounts to a large sum yearly. This waste does not take into consideration many other losses also due to scale formation.

Almost from the beginning of the operation of steam driven boats on the Great Lakes various types of material have been used for the prevention of boiler scale. Up to a few years ago these materials were crude, ineffective and in many cases, harmful. The problem was approached in many different ways, with no consideration given to the proper application and control of the boiler water chemical equilibrium. As a result the patient and conscientious effort of the engineer came to naught.

The purpose of this article is to make the chemical reactions experienced in boiler water treatment more clearly understood. The various phases of the reactions are divided into separate groups.

Waters of the Great Lakes

Our problem is greatly simplified because the waters of the several Great Lakes are of the same type and vary only in the amounts of chemical salts present. It will be noted from the accompanying table giving the chemical analysis of the waters of the Great Lakes, that there are two different types of salts which make up the hardness of the water.

To identify the reactions, the hardness elements of the water are divided into two classes called permanent and temporary hardness. In addition to the elements that cause hardness there is another type of salts present, called sodium salts. Other salts mentioned will not be discussed until later as the three types mentioned above are the only ones with which we need concern ourselves.

What Temporary Hardness Is

The temporary hardness salts as shown in the analysis in the accompanying table consist of the carbonates and bi-carbonates of calcium and magnesium.

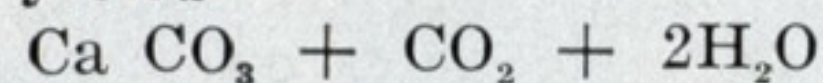
Chemically they are expressed as follows: calcium bi-carbonate, $\text{Ca}(\text{HCO}_3)_2$; calcium carbonate, CaCO_3 ; magnesium bi-carbonate, $\text{Mg}(\text{HCO}_3)_2$; magnesium carbonate MgCO_3 .

This article was prepared by N. B. Graham, manager, marine department, Elgin Softener Corp., Elgin, Ill.

CORRECT treatment of water used in marine boilers is now generally recognized as a factor of great importance in good operation. It not only saves fuel cost, but will also prolong the life of the boiler and reduce repairs and replacements. In this article the chemical reactions experienced in boiler water treatment are described in a simple and clear manner as an aid to a practical understanding of the problem.

These salts under boiler temperature and pressure will decompose and form mud without the use of any treatment whatsoever. The reactions are as follows:

$\text{Ca}(\text{HCO}_3)_2 + \text{H}_2\text{O} + \text{heat}$
which yields

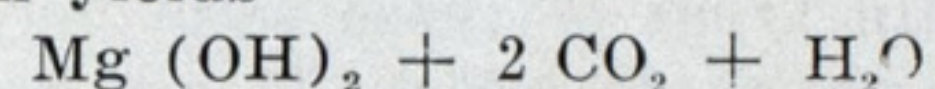


It will be noted that the product of this reaction is CaCO_3 , calcium carbonate, which is nothing more or less than mud, CO_2 , carbon dioxide gas and H_2O , water. The water we know is harmless. The gas is the primary component of carbonic acid. A large proportion of this gas is carried out of the boiler with the steam. Where condensation takes place such as in a surface condenser this gas will dissolve in the condensate forming carbonic acid and if not neutralized corrosion will result. Also, the residue of the gas in the boiler water not carried out by the steam must be neutralized or corrosion of the boiler metal will take place.

The mud is chemically inert and the harm it will do to a boiler is of a physical nature rather than of a chemical nature. This is brought about by the quantity of mud in the boiler being allowed to accumulate to such a degree that the mud itself will bake on the heating surface in the form of a soft scale.

The action of the magnesium bi-carbonate, $\text{Mg}(\text{HCO}_3)_2$ is the same as for calcium bi-carbonate with the exception that the magnesium hydroxide is the mud product formed. The equation is as follows:

$\text{Mg}(\text{HCO}_3)_2 + \text{H}_2\text{O} + \text{Heat}$
which yields



It will be noticed that in this reaction there are two molecules of carbon dioxide gas formed while in the calcium bi-carbonate reaction only one molecule was formed. The mud in this case, magnesium hydroxide, $\text{Mg}(\text{OH})_2$, while having a different physical structure has the same action in the boiler and must be handled in the same manner as the calcium carbonate.

What Permanent Hardness Is

The permanent hardness of the lake waters is the salt of magnesium sulphate, MgSO_4 . As the water is evaporated from the boiler, salts are left behind and the concentration of these salts continue to build up and increase in amount until the water becomes saturated or can hold no more. This

Chemical Analyses of Great Lakes Waters

Chemical Salts Present in Lake Waters - Grains per U. S. Gallon	Lake Superior	Lake Michigan	Lake Huron	Lake Erie	Lake Ontario
Calcium Carbonate	1.90	4.70	3.51	5.00	4.53
Magnesium Carbonate	.63	2.02	1.23	.67	1.12
Calcium Sulphate					
Magnesium Sulphate		.28	.28	1.44	.48
Calcium Chloride					
Magnesium Chloride					
Iron & Al Oxide	.01	.02			.01
Silica	.43	.30	.70	.76	.39
Sodium Salts	.37	.49	.49	.70	1.23
Total Solids	3.34	7.71	6.21	8.36	7.76
Alkalinity	2.69	7.10	4.97	5.80	5.86
Total Hardness	2.65	7.33	5.20	7.00	6.26

is the point where permanent hardness scale begins to form.

This scale is very hard and of a brittle nature. One of the purposes of treating boiler water is to change the chemical nature of this salt so that it will form mud instead of scale.

Sodium salts are so constituted by nature that they are extremely soluble, never forming mud and never forming scale unless the concentration becomes extremely high, causing a saturated solution; in which case they will crystallize out. It is doubtful if this ever happens on the Great Lakes because of the great amount of mud which would accumulate in obtaining such a concentration and of the limitation of the boiler itself.

Practically the only objection to sodium salts in the water is their effect upon the concentration, consequently upon the chemical balance in the boiler. This will be taken up under the discussion of concentration later on in this article.

There is no way to eliminate sodium salts from the boiler except by the use of evaporators. The quantity of the salts can be reduced by blow-down but never eliminated and it is for this reason that they play such an important role in the control of boiler water concentration and chemical balance. Certain types of these salts may also have corrosive effects if not neutralized.

Definition of Terms

To avoid confusion we will define the more uncommon terms used.

Insoluble and suspended matter, which in reality are the same thing, can properly be considered as nothing more nor less than mud.

Soluble matter or soluble salts are the salts which are actually dissolved in the water. To give an example of the nature of soluble salts, dissolve in a glass of water a little table salt, sodium chloride, one of the soluble salts in the boiler. This salt can be removed from the water only by complete evaporation of the water and in order to reduce the amount of salt in a given volume of water, the water would have to be diluted.

The concentration of a boiler water, as the term is most generally used, is the amount of salts present in a gallon of the water. This is expressed in grains per gallon. There are 7000 grains in one pound by weight. This gives us the weight of salts per gallon of water in the boiler.

There are two kinds of concentrations; soluble and insoluble, the most important being soluble. The insoluble concentration is the concentration of mud suspended matter in the boiler. The soluble concentration is the concentration of the soluble salts in the boiler.

The chemical balance of a boiler water is the ratio maintained between the various chemicals in the water

and the ratio of their concentration to each other.

Coagulation is the accumulation of many small particles of insoluble matter into one large particle or floc and the increasing of the specific gravity of this large floc or particle so that it will settle out readily.

Boiler Water Treatment

Among the more important things to be considered in the treatment of a boiler water are: removal of old scale; prevention of scale formation; corrosion and pitting; embrittlement of the boiler metal; foaming and priming; and the maintenance of clean, dry steam.

The prevention of new scale requires the same type of treatment as the removal of old scale except in the case where old scale is the result of previous improper treatment. A positive control of the removal of old and the prevention of new scale may be obtained if proper treatment is applied in accordance with daily tests of the boiler water, which in turn signify the chemical balance. Proper boiler water treatment applied so as to maintain a correct chemical balance within the boiler will not only prevent formation of new scale and remove the old, but will also prevent corrosion and pitting, embrittlement of the boiler metal and any tendency toward foaming. No single chemical will do this. It is necessary for proper treatment, therefore, to use a number of different chemicals in correct proportions, each having its own work to do in the building of the chemical balance.

Careful consideration should be given to the choosing of a treatment. Many compounds are based upon the coagulating properties of their constituents. It is inadvisable to use a treatment which is primarily a coagulant and which is made up in a single general form because the coagulation of boiler water is a distinct problem in itself and should not be confused with the treatment of the boiler water for the maintenance of chemical balance.

The best results which can be hoped for from a boiler water treatment are outlined above and if these results are attained it is all that can be done with a boiler water treatment.

Then comes the problem of the removal of the mud. Some treatments produce a great deal more mud or suspended matter than others. In these cases, of an undue amount of mud or suspended matter, the bad effect is sometimes demonstrated by blistered tubes or an excessive blow-down which is not only wasteful and harmful but costly as well. By the use of deconcentrators the mud which is formed in the boiler is continuously removed without a heavy blow-down loss. By removing the mud continuously a higher soluble concentration may be

carried without the danger of foaming and priming. Consideration will now be given to the causes of foaming and priming and the relation of concentration to the chemical balance.

Foaming is due to improper surface tension of the water in the boiler with the result that the film of liquid surrounding the steam bubble does not break and free the steam. This condition may be caused by too high a soluble concentration or by the mud being in a very finely divided state or that the chemicals in the boiler are unbalanced with relation to each other. It may also be caused by the saponification of oil in the boiler if sufficient quantities of oil get into the boiler.

For the correction of foaming if it is caused by high soluble concentration, the boilers should be blown down and the remaining solution of soluble salts diluted with fresh water. The soluble concentration, however, should never be so high as to cause this condition for it can be regulated easily by the use of a concentrimeter, an instrument to register soluble concentration directly in grains per gallon.

If, however, the cause of foaming is such finely divided mud that it is practically in a colloidal condition it may be corrected by the use of a coagulant. Too much coagulant, however, should not be used for it must be remembered that all coagulants form mud themselves, some more than others. This condition can be determined by looking at a sample of the boiler water in a test tube and noting how long it takes for the mud to settle.

Keep Oil Out of Boiler

In connection with saponification of oil and grease, a mineral oil will not saponify; only grease or substances that have a fatty material in them will saponify. Some oils of this character will cause trouble. Oil, however, should never be allowed to get into the boiler. If, despite the most rigid precautions, oil should get into the boiler the only method of getting rid of it is to use a good coagulant to precipitate the oil. Then blow the boiler down to get rid of the precipitation of oil. It should be repeated that every means possible must be used to keep oil from getting into the boilers in the first place.

Priming is usually the result of organic matter present in the water and is the entire body of water in the boiler lunging back and forth.

To avoid caustic embrittlement the correct sulphate alkalinity should be maintained as recommended by the American Society of Mechanical Engineers. This in most cases on the lakes would be two grains of sulphates to one of alkalinity.

If a boiler water treatment is effective and gives the results expected from it, it should be fed either directly

(Continued on Page 40)

British Naval Architects Hold Summer Meeting

The Institution of Naval Architects will hold its summer meeting in London on July 10 to 13 inclusive. Representatives of experimental tanks in Great Britain and in other countries have been invited to take part in an international conference on problems connected with ship resistance and propulsion.

An abstract has been prepared of results published on a methodical series of resistance experiments on ship models and their use and design. This abstract has been prepared by G. S. Baker, superintendent of the William Froude Laboratory and A. W. Riddle, assistant in the William Froude laboratory.

It brings together the various papers on experiments on ship hulls carried out in the Alfred Yarrow tank at the National Physical laboratory, Teddington, since 1911. These results are collected and condensed so that with little labor the data can be applied to any given set of conditions. The results are given in the form of tables of model dimensions and constants together with 30 figures of comparative resistance curves, lines, etc.

From the collected data given the broad effect of a number of changes can be obtained, and general results can readily be applied to hulls which differ in form quite materially from the series dealt with. The method of using the data is illustrated by examples, so that readers not accustomed to the "constant" notation will be able to utilize the work without difficulty.

Cabin Picket Boats

On May 28 bids were opened at the United States engineer office, Philadelphia by Major Mason J. Young for constructing and delivery afloat of two 36-foot cabin picket boats.

Ten bids were received, the lowest of which was from the Robinson Marine Construction Co., Benton Harbor, Mich., at \$17,500, with delivery in 120 days. Other bids ranged in amount from \$17,980 with delivery in 90 days from the Salisbury Yacht Building Co. Inc., Salisbury, Md., to \$24,744 and 100 days from the Electric Boat Co., Bayonne, N. J. No award had been made.

Sails on Maiden Voyage

The S. S. MANUELA, sister ship of the ANGELINA described in the June issue of MARINE REVIEW, sailed from Pier 22, Brooklyn, N. Y., June 9 on her initial voyage to San Juan and other Puerto Rican ports.

The MANUELA, built by Newport News Shipbuilding & Dry Dock Co. for A. H. Bull Steamship Co., is 410 feet, 9 inches long, 55 feet beam, and has a deadweight of 7250 tons.

On returning from her initial voyage from New York to Puerto Rico, the ANGELINA, sister ship of the MANUELA, covered the distance of 1490 miles in the remarkably fast time of 3 days, 22 hours and 14 minutes.

Capt. William E. Briggs, associated with the Bull line for more than 20 years, is master of the MANUELA.

Appointed New Commander Of S. S. Santa Rosa

When the Grace Line's flagship, SANTA ROSA, sailed on June 8 from New York for Pacific coast ports, Capt. Alf Adler, one of the youngest American skippers to command a big passenger ship, was on her bridge. He succeeds Capt. Kurt Zastrow, who is leaving for the west coast to act as relief captain of the company's ships.

Captain Adler, 31 years of age, has held his master's certificate since he was 25. He has commanded six vessels of the Grace line in recent years, his last command being the SANTA CECILIA, one of the company's four cabin liners recently withdraws from the intercoastal trade.

The SANTA ROSA, one of four cabin liners built especially for the intercoastal trade, has a displacement of 16,500 tons. She is 508 feet long and has a speed of 20 knots. After leaving New York, the ports of call are Havana, Puerto Colombia, Cartagena, Cristobal, Balboa, La Libertad, San Jose de Guatemala, Mazatlan, Los Angeles harbor, San Francisco, Victoria and Seattle.



Capt. Alf Adler
New commander, S. S. Santa Rosa

One Hundredth Round Trip Made by Ile de France

The French line's flagship, the ILE DE FRANCE, has the distinction of having completed the westbound half of her one hundredth round trip since she entered service seven years ago. The ILE DE FRANCE arrived in New York June 12.

Since sailing on her maiden voyage on June 22, 1927, from Havre for Plymouth and New York, the ILE DE FRANCE has carried in the transatlantic service almost 160,000 passengers. Including the number she was conservatively expected to carry when she sailed eastbound on June 16, her grand total is 159,002, of which 71,794 are first class passengers. Therefore, her average from the 100 crossing in each direction is 795 passengers per crossing, 359 of them in first class.

Of the grand total of 159,002 in all classes, there were 77,203 westbound passengers and 81,799 eastbound passengers. Of the 71,794 first class passengers, 35,747 were westbound and 36,047 were eastbound.

The success the ILE DE FRANCE has achieved, as attested by the number of passengers averaged in season and out, indicates her popularity with the traveling public.

Admiral Hughes Dies

Retired since 1930, Admiral Charles F. Hughes, former commander-in-chief of the United States battle fleet and chief of naval operations, died on May 28 at his home Chevy Chase, Md.

He was born in Bath, Me., Oct. 14, 1866, and graduated from the United States Naval academy in 1884. His promotion after becoming a commander in 1910 was rapid. He became a captain in 1914 and a rear admiral in 1918. In 1913-14 he was chief of staff of the Atlantic fleet.

During the Spanish American war, he took part in the battle of Manila. In 1912 he was with the fleet at Vera Cruz and again when this city was captured in 1914.

From 1914 to 1916 Admiral Hughes was a member of the general naval board. From November, 1917, to October, 1918, he served with British grand fleet in the North sea.

He was commandant of the Philadelphia navy yard in 1918-1920 and served as commandant of the naval war college in 1923-1924.

The EUROPA, North German Lloyd express liner, sailed from pier 86, foot of West Forty-sixth street, New York, on June 1 for Cherbourg, Southampton and Bremen carrying a passenger complement of 1575.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review

By Harry Bowne Skillman

Attorney at Law

A BARGE owner, as bailee of a cargo lost when the barge sank, was entitled to recover damages from the owner of a tug which collided with the barge, though title to the cargo was in the vendee, instead of the vendor who paid the loss. Either the bailee or the bailor may maintain an action against a tort-feasor who injures the property while in the custody of the bailee, and recover the full damages; but a recovery of damages by one, and payment by the wrongdoer, will be a full satisfaction, and may be pleaded in bar at any subsequent suit by the other.—*W. C. BLOCK*, 5 Fed. Supp. 47.

* * *

WHERE a charter party provided that the charterer should load, store, and trim cargo at its expense under the master's supervision, and the vessel was loaded during the absence of the master, for whom the mate was acting, the owner was liable to the charterer for the expense and loss due to delay necessitated by partial unloading and retrimming. The charterer was also entitled to off hire due to the partial unloading and retrimming necessitated by the overloading of the vessel under the mate's direction.—*Mobile, Miami & Gulf Steamship Co. v. Lake Giltedge Steamship Co.*, 68 F. (2d) 370.

* * *

UNDER voyage rule, supplies taken on board and repairs furnished before breaking ground, but in preparation for the voyage, have an equality or parity with repairs or supplies at a port of call on the voyage.—*BRIMSTONE*, 69 F. (2d) 106.

* * *

CHARTERS must be construed according to the intent of the parties as manifested by the whole instrument rather than by the literal meaning of any particular clause taken by itself. Any exception in the charter in favor of the shipowner is to be most strongly construed against him, especially if it tends to weaken the warranty of seaworthiness. A clause giving liberty to sail without pilots is entirely inconsistent with warranty of seaworthiness and the obligation to use due diligence to make the vessel seaworthy if failure to employ a local pilot would render the vessel unsea-

worthy at the beginning of the voyage. Where pilotage is customary at a port, a pilot is available, and the nature of the navigation requires one, it is a breach of the warranty of seaworthiness if a pilot is not taken.—*FRAMLINGTON COURT*, 69 F. (2d) 300.

* * *

CRITICISM of salvage services because the towing line broke, as frequently happens in heavy seas, was held insufficient, in the case of *WEST HARSHAW*, 69 F. (2d) 521, to deprive the salvors of a fair award. In this case, it appeared that the salving vessel traveled 120 miles in reaching the disabled steamship, stood by during a hurricane for a night when the steamship was helpless and her lifeboats were gone, towed her 145 miles through high seas until she was able to repair her rudder chain and the winds and waters had quieted down, and convoyed her 74 miles, spending on the entire service one day and twenty-two hours. The value of the steamship was \$200,000, and the value of her cargo was \$300,000. A salvage award of \$15,000, of which \$6000 was salvage attributable to the ship, was held proper.

* * *

CHARTER party provisions should be construed most strongly against the party who prepared the contract. Interlineations in handwriting and typewriting must be considered as overruling any portions of the printed contract which are inconsistent with them. A provision that the ship should pay "cranage if shore cranes are employed" required the ship to pay reasonable and customary charge for shore cranage services even where cranes used belonged to the charterer, not only where the charterer was required to pay others for cranage services.—*AUGUST*, 5 Fed. Supp. 463.

* * *

A SHIP is not an insurer of its appliances, nor of the invitees who may operate the gear. It is bound, however, to furnish suitable tackle and machinery, reasonably safe and strong for the work at hand. A secret defect in such gear, even though effecting casualty, will not fasten responsibility upon the vessel or her owners. If by due care, however, its

officers or crew knew, or might have known, that any weakness existed, it is held to strict liability. In such matters the officers and crew are bound to use ordinary care. But this standard implies the exercise of vigilance proportioned to the dangers reasonably to be anticipated in the light of common experience and prudence. Since any break in the overhead tackle is fraught with possibility of serious casualty, the highest degree of care in this respect is required.—*MERCIER*, 5 Fed. Supp. 511.

* * *

TO CONSTITUTE corporal punishment within the federal statute forbidding flogging or corporal punishment on vessels, it must be done by virtue of an authority to which the person punished was subject. When a ship's fourth officer departed from his duty as an officer of the vessel and inflicted bodily harm upon a saloon watchman solely because of a purely personal motive, it cannot be said that such action comes within the meaning of the statute; hence, recovery of damages against the shipowner was properly denied—*Fowler v. American Mail line*, 69 F. (2d) 905.

* * *

IN THE case of *SACHEM*, 5 Fed. Supp. 417, it appeared that the stairway from the upper to the main deck of a fishing boat was constructed in the customary and usual manner, and, while steep, was entirely safe for use. While descending the stairway, libellant, a woman of 54, five feet five inches in height and weighing 167 pounds, fell. The court held that the libellant solely at fault in descending the stairway in wearing shoes with heels three or four inches high.

* * *

IN ORDER to recover the statutory penalty for refusing to pay a seaman's wages, it is not enough to prove that the captain was wrong; it must also be shown that he acted arbitrarily and without reasonable cause. A seaman leaving his ship before completion of the voyage was held, in the case of *Gold v. Matson Navigation Co.*, 5 Fed. Supp. 971, entitled to a decree for wages earned, though not for the statutory penalty for refusal to pay wages.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	291	1,597,233	316	1,662,711
April	288	1,599,185	274	1,477,492
March	302	1,706,307	313	1,757,221
February	265	1,481,004	267	1,508,905
January	266	1,649,590	284	1,629,438
December	263	1,496,477	291	1,576,199
November	243	1,257,443	277	1,452,269
October	278	1,573,534	268	1,487,369
September	294	1,847,558	289	1,771,847
August, 1933	315	1,884,475	316	1,928,611

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	58	169,719	50	143,652
April	67	199,032	48	147,083
March	59	162,480	48	140,311
February	42	129,940	36	109,973
January	45	139,259	47	133,427
December	54	175,715	45	135,969
November	47	144,111	40	119,896
October	68	186,588	51	152,700
September	65	182,418	44	126,290
August, 1933	61	181,283	61	178,894

Boston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	105	301,785	82	245,571
April, 1934	86	309,725	58	227,404
March	88	304,604	64	259,406
February	71	247,077	46	162,542
January	97	330,320	60	225,075
December	84	303,806	52	236,871
November	90	323,540	62	230,969
October	96	335,488	60	210,010
September	110	348,981	80	279,531
August, 1933	129	453,348	101	329,686

Portland, Me.

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	15	27,376	15	32,378
April	14	20,555	15	20,572
March	13	33,399	13	33,399
February	11	27,213	11	27,213
January	9	22,908	10	25,570
December	13	31,801	13	32,589
November	15	29,335	18	35,579
October	14	27,953	14	32,913
September	15	26,225	12	28,028
August, 1933	16	28,877	18	32,727

Providence

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	3	4,985	1	2,022
April	3	4,985	1	2,022
March	5	17,973	2	7,422
February	7	20,959	2	6,882
January	2	7,694		
December	5	5,089	2	8,350
November	3	8,568	4	12,794
October	4	13,606	4	9,730
September	2	4,430	5	13,279
August, 1933	6	11,862	4	10,186

Portland, Oreg.

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	11	41,765	17	58,993
April	31	117,094	42	157,954
March	32	121,085	50	186,817
February	25	95,774	52	198,593
January	32	116,610	50	188,401
December	31	119,833	51	184,646
November	29	108,890	35	130,457
October	26	102,926	46	173,030
September	25	97,576	38	141,839
August	22	83,506	34	129,908
July, 1933	26	99,339	29	111,559

Baltimore

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	104	329,312	107	328,998
April	102	300,396	108	334,583
March	92	288,061	88	273,131
February	77	261,122	77	263,236
January	78	256,942	80	265,681
December	94	298,001	92	286,746
November	90	270,023	88	267,784
October	88	284,997	90	289,864
September	85	273,994	84	270,189
August	95	299,114	98	307,841
July, 1933	91	272,589	90	282,788

Norfolk and Newport News

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	31	315,721	50	362,154
April	21	65,701	47	125,291
March	23	64,469	60	151,360
February	16	47,708	41	102,933
January	22	68,930	41	112,922
December	17	57,307	42	119,186
November	19	55,692	49	115,584
October	16	56,239	49	125,591
September	15	47,575	35	89,775
August, 1933	17	52,764	44	106,570

Jacksonville

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	14	13,340	22	38,824
April	10	10,464	7	12,164
March	9	16,338	9	11,193
February	8	10,900	11	20,348
January	7	13,017	10	22,508
December	8	15,083	11	22,837
November	8	13,405	8	19,108
October	11	24,365	6	8,893
September	8	11,528	7	13,086
August, 1933	7	12,477	7	13,152

Key West

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	40	57,180	42	58,094
April	28	36,197	21	36,066
March	24	38,052	23	37,658
February	23	36,476	24	36,523
January	25	39,966	22	38,764
December	22	38,764	22	38,764
November	23	33,556	22	31,336
October	22	37,180	23	39,878
September	22	38,648	23	38,659
August, 1933	18	33,210	18	32,716

Mobile

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	115	255,503	114	253,294
April	113	254,839	103	239,371
March	115	275,629	129	309,123
February	115	268,707	112	251,232
January	118	282,972	125	298,570
December	123	279,151	109	253,209
November	114	260,755	114	249,344
October	118	247,474	124	297,436
September	116	265,547	113	266,183
August, 1933	100	223,940	102	203,716

Seattle

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	22	103,441	19	86,295
April	62	264,608	67	278,172
March	52	203,796	51	205,371
February	54	226,118	62	251,281
January	52	221,000	55	230,995
December	54	225,842	60	246,987
November	54	222,914	51	211,474
October	58	253,865	59	254,959
September	35	154,233	40	174,263
August, 1933	40	183,028	41	182,626

New Orleans

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
April, 1934	169	487,655	170	475,121
March	155	422,855	166	449,394
February	151	446,952	145	414,515
January	146	423,759	145	414,918
December	139	398,112	152	443,496
November	148	439,238	152	430,631
October	154	467,332	169	506,324
September	154	443,981	168	470,271
August	144	420,570	151	429,183
July	169	468,111	184	493,775
June, 1933	147	422,280	146	422,235

Charleston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	36	98,475	23	69,764
April	38	101,315	34	96,705
March	44	131,839	37	109,492
February	40	112,884	39	109,597
January	23	60,138	25	66,827
December	35	111,420	32	97,473
November	43	123,628	39	109,151
October	34	97,585	33	91,526
September	42	116,048	32	83,944
August, 1933	33	92,987	27	76,881

Galveston

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	21	34,457	56	141,885
April	27	50,294	82	219,283
March	29	54,379	94	264,101
February	22	41,945	77	236,784
January	23	43,664	86	252,595
December	19	40,552	90	279,537
November	16	37,590	85	262,800
October	21	44,388	104	304,402
September	10	19,602	94	277,642
August	19	44,012	69	205,442
July, 1933	22	33,718	77	213,821

Los Angeles

(Exclusive of Domestic)

Month	Entrances—		Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	200	754,695	197	738,307
April	186	696,716	167	679,883
March	168	669,548	169	691,230
February	154	629,859	165	624,170
January	176	686,201	146	616,189
December	169	639,444	164	629,462
November	143	539,624	162	592,724
October	160	623,572	152	592,212
September	154	562,597	152	561,294
August, 1933	156	578,255	156	605,610

San Francisco

(Exclusive of Domestic)

Month	—Entrances—		—Clearances—	
	No. ships	Net tonnage	No. ships	Net tonnage
May, 1934	152	452,827	140	593,715
April	165	831,501	169	729,273
March	150	659,251	181	772,219
February	141	503,105	154	659,366
January	163	722,800	197	764,823
December	137	616,820	172	739,604
November	144	619,874	182	806,020
October	169	753,650	168	717,133
September	150	654,888	141	658,887
August, 1933	174	748,739	170	743,918

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

THE tanker shipbuilding program now under way for the Standard Vacuum Transportation Co., which has been reported in previous issues of MARINE REVIEW entails the expenditure of approximately \$5,000,000. This program is giving employment to hundreds of shipyard workers. Two ocean going tankers are building at the New York Shipbuilding Co., Camden, N. J., and work on three self-propelled diesel tankers is well under way at the plant of the United Dry Docks Inc., Staten Island, N. Y. These smaller vessels are for service on the rivers, New York state barge canal and the Great Lakes.

According to J. J. Maguire, president of the Standard Vacuum Transportation Co., the two ocean going tankers will cost approximately \$4,000,000. They will be under construction for a period of 12 to 14 months, during which time there will be an average of 2000 men employed in the shipyard alone. In addition to this number of men actually employed in the building of the vessel, employment is also given to a large number of men in other plants where such equipment as boilers, engines, electrical generators, pumps, and other auxiliaries are being manufactured.

The two large tankers will be 500 feet long; 65 feet 9 inches in beam; 37 feet in depth; and will have a total deadweight of 15,285 tons, on a draft of 29 feet 10 1/4 inches. The total capacity of each tanker will be 5,330,000 gallons in ten main double tanks and six summer tanks. Propulsion will be by single screw driven by double reduction geared turbines developing 4000 shaft horsepower. The speed will be 12 1/2 knots. Estimated fuel consumption for 24 hours will be 30 tons. The two tankers, it is expected, will be launched in the fall of 1934, and they will be ready for service early in 1935. They are to trade between the Atlantic seaboard and Pacific coast ports.

Launch River Dredge

The St. Louis Shipbuilding & Steel Co., St. Louis, recently launched a large sand dredge under construction for the Sternberg Dredging Co., St. Louis.

The new vessel is of all steel construction and like others for the same company, is a departure from the conventional type of dredge. The new craft is 175 feet long and 50 feet in beam.

The St. Louis Shipbuilding & Steel Co. sometime ago took over the Carondelet Foundry formerly operated by the Rohan Shipbuilding Co. and has recently been operating with 60 employees. The company now has under construction a number of other new type of craft, several of which are nearly ready for launching. Among these is a new vessel for the federal government.

Construction Loans

A public hearing was to be held on June 25 at the offices of the United States shipping board bureau in Washington to act on the application of the Waterman Steamship Corp., Mobile, Ala., for two loans from the government construction loan fund.

If authorized by the department, the two loans, totaling \$262,340, will be used in the reconditioning of two of the Waterman company's ships. The owner plans to increase their speed to 13 knots, install refrigerating equipment and to extend and improve the passenger accommodations.

The United States engineer office, Louisville, Ky., awarded contract for constructing 50 steel pontoons to the Ingalls Iron Works Co., Birmingham, Ala. on its bid of \$61,900 f.o.b. Paducah, Ky. The same office also has awarded a contract to the Midland Barge Co., Midland, Pa., for the construction of 156 sections of steel pipe on its bid of \$17,700 f.o.b. Paducah, Ky.

Patrol Boat Is Launched

The first of the three patrol boats being built by the Lake Union Dry Dock & Machine Works, Seattle, for the United States coast guard, named the ATALANTA, was launched in rather an unusual manner on June 16. The vessel was shifted on ways into the company's floating dry dock. The dry dock was then submerged and the vessel floated free. The ATALANTA was christened by Miss Barbara Hinckley, daughter of Capt. H. D. Hinckley, who was, until recently, commander of the Seattle division of the coast guard.

The second vessel, the ARIADNE, will be launched sometime in July and the third vessel, CYANE, will be laid down on the building ways made vacant by the launching of the ATALANTA. She is to be ready in the latter part of this year.

When she goes into commission the ATALANTA will be assigned to Puget sound and adjacent waters. The CYANE will be assigned to Alaskan waters and her base will be Ketchikan. The ARIADNE will go in service around San Francisco.

These patrol boats, of steel construction, are 165 feet in length overall; 25 feet 3 inches in beam molded; and 13 feet 2 inches in depth molded amidships. They are each fitted with twin propellers driven by Winton diesel engines developing 650 shaft horsepower each. Cruising speed will be 16 knots. Commander W. C. Maglathin is representing the United States coast guard as supervisor of construction.

The Newport News Shipbuilding & Dry Dock Co. early in June was awarded contract by the United Mail Steamship Co. for reconditioning the vessels ABARANGEZ, and TURRIALBA. The amount involved is approximately \$500,000 for work on the two vessels. It is understood that passenger accommodations will be somewhat reduced and refrigeration facilities considerably increased.

Requests Bids for Tender

The commissioner of lighthouses, Washington, will receive bids until 2 o'clock p.m., July 23 for the construction and delivery of one twin screw, steel hull, diesel engine propelled tender for the eighth lighthouse district, New Orleans.

The new lighthouse tender, to be known as the JASMINE, will have a length extreme of 91 feet, 4 inches; length overall molded, 90 feet; length between perpendiculars, 82 feet; beam molded, 23 feet; depth at side, 8 feet 3 inches. The displacement at a mean draft of 5 feet 3 inches in salt water will be approximately 184 tons. Propulsion will be by two diesel engines each of 100 shaft horsepower or a total shaft horsepower of 200 at 400 revolutions per minute.

Delivery of this vessel is to be made to the bureau of lighthouses at New Orleans. Bids may also be based on delivery of the vessel at the builder's plant.

This vessel is to be constructed from funds provided by the public works administration. The rates of wages and hours of labor will be in accordance with the shipbuilding and shiprepairing code.

Diesel River Towboat Bids For U. S. Engineers

The United States Engineer office, Vicksburg, Miss., on May 29 opened bids for the construction and delivery afloat at Vicksburg, Miss., of one steel hull, twin screw, diesel driven river towboat. These bids were in response to an advertisement issued April 24.

The lowest bid received was in the amount of \$314,750 and 180 days, from the Marietta Mfg. Co., Point Pleasant, W. Va., and it is understood that contract has been or will be awarded to this company.

Other bids received were from the Midland Barge Co., Midland, Pa., \$344,000 and 250 days; Chicago Bridge & Iron Co., Chicago, \$339,800 and 300 days; Nashville Bridge Co., Nashville, Tenn., \$364,850 and 360 days; and the Dravo Contracting Co., Pittsburgh, \$343,630 and 250 days. Alternate bids were also made by Marietta Mfg. Co., Nashville Bridge Co., and the Dravo Contracting Co.

This vessel is to be 176 feet in length molded, 38 feet in beam of hull molded and 8 feet, 6 inches depth molded. The two engines are to be of full diesel type, direct reversible and are to develop 650 brake horsepower at 250 revolutions per minute. Besides the main propelling engine there are to be two 75-kilowatt 125-volt direct current full diesel driven generating sets.

Naval Building Program

The naval building program authorized under the Vinson act is to be started promptly. The immediate program calls for an expenditure of \$90,000,000, and will include one heavy cruiser, two 10,000-ton cruisers, 12 destroyers, two destroyer leaders, and six submarines.

This represents the start of the construction of 102 additional ships to bring the United States navy up to the London treaty limits. It is now expected that a request for bids will be submitted to shipyards within 50 days.

Funds for building the cruisers are to come out of current naval appropriations while the destroyers and submarines will be started with money set aside from public works funds, appropriated by the congress. This can now be done by the administration without further reference to congressional authority.

Airplane Carrier Ranger

The airplane carrier RANGER, built by the Newport News Shipbuilding & Dry Dock Co., was officially accepted by the navy department at Norfolk on June 4. She was placed in command of Capt. Arthur L. Bristol, by Rear Admiral Arthur St. Clair Smith, acting commandant of the Norfolk naval district.

On her preliminary sea trials she is said to have exceeded her designed speed of 29½ knots. Her general performance was also highly satisfactory.

Tonnage of Normandie

According to first estimates by the builder, the gross tonnage of the giant French liner NORMANDIE, now under construction, would be 68,000 tons. These estimates have now been revised on the basis of greater accuracy possible as the vessel approaches nearer to completion, and it is believed that the gross registered tonnage will actually be between 78,000 and 79,000 tons.

British shipping men are speculating on whether the tonnage of the new Cunarder will be altered in a similar manner from the original figures given of 73,000 tons. The gross registered tonnage is generally accepted as a measure of size. The question now is will the NORMANDIE or the new Cunarder have the distinction of being the largest ship in the world.

The McClintic Marshall Corp., Bethlehem, Pa., was the low bidder at \$85,140, for furnishing and delivery afloat of 44 steel dredge pontoons to the United States engineer office, Vicksburg, Miss. Bids were opened on June 12.

Model Experiments Used For New Cunarder

Information has been received on several interesting features in connection with the construction of the Cunard superliner at John Brown & Sons, Clydebank. The vessel will have three funnels. The diameter of each funnel will be approximately 30 feet. The forward funnel will be more than 70 feet in height from the boat deck, with the two other funnels decreasing in height. From the keel to the top of the forward funnel will be approximately 180 feet. Final design of the funnels was based on the results of numerous trials in a specially constructed wind tunnel. More than 30 models were tested.

The rudder for the new liner weighs nearly 140 tons and is by far the largest ever made. It will be completely assembled and tests carried out to make certain that every detail is perfect. It will then be dismantled and transported in sections to the liner's berth where it will be reassembled and fitted to the ship.

To determine the design and form of the hull 16 models were used and over 4000 experiments were carried out in the model tank.

In order to determine the proper position for the hawsepipes, a wooden replica of the bow of No. 534 was erected. A series of tests were made with models of the hawsepipes and of the anchors to establish perfection in action.

In a series of fullsized model cabins, constructed ashore, everything that goes into a typical stateroom in all three classes of accommodations will be given a critical practical trial. These rooms will be exactly like similar rooms which it is intended to build into the ship, and the model rooms will be fitted out to the last detail by experts in design and furnishings. In this way decorative and furnishing schemes to provide maximum comfort and restfulness will be established. Experiments will also be carried out in heating, lighting and ventilation of the rooms.

Bunker Prices									
At New York				At Philadelphia				Other Ports	
Coal	Fuel oil	Diesel engine		Coal	Fuel oil	Diesel engine		June 19, 1934	
F. o. b.	alongside	oil alongside		trim in bunk	alongside	oil alongside			
per ton	per barrel	per gallon		per ton	per barrel	per gallon			
June 19, 1934...5.63@5.48	1.35	4.79		June 19, 1934...4.93@4.78	1.35	4.76		Boston, coal, per ton.	\$ 7.96
May, 18.....5.63@5.48	1.35	4.79		May 18.....4.93@4.78	1.35	4.76		Boston, oil, f. a. s. per	
April 19.....5.63@5.48	1.35	4.79		April 19.....4.93@4.78	1.35	4.76		barrel.....	\$1.30
Mar. 19.....5.35@5.20	1.25	4.79		Mar. 19.....4.65@4.50	1.25	4.76		Hampton Roads, coal, per	
Feb. 19.....5.35@5.20	1.25	4.79		Feb. 19.....4.65@4.50	1.25	4.76		ton, f.o.b. piers.....	\$5.00
Jan. 18.....5.35@5.20	1.25	4.79		Jan. 18.....4.65@4.50	1.25	4.76		Cardiff, coal, per ton....	13s 6d
Dec. 18.....5.35@5.20	1.25	4.79		Dec. 18.....4.65@4.50	1.15	4.76		London, coal, per ton....	—s —d
Nov. 18.....5.35@5.20	1.15	4.70½		Nov. 18.....4.65@4.50	1.15	4.76		Antwerp, coal, per ton..	15s 0d
Oct. 18.....5.00@5.75	1.15	4.70½		Oct. 18.....5.00@5.75	1.15	4.76		Antwerp, Fuel oil, per ton—	s —d
Sept. 18.....4.45@4.75	1.15	4.70		Sept. 18.....4.45@4.75	1.15	4.88		Antwerp, Diesel oil, per	
Aug. 18.....4.45@4.75	.90	4.32		Aug. 18.....4.45@4.75	.90	4.28		ton.....	—s —d
July 18, 1933...4.30@4.60	.90	4.32		July 18, 1933...4.30@4.60	.90	4.28½		British ports, Fuel oil...—	s —d
								British ports, Diesel oil. —	s —d
Note: Figures given for coal at New York and Philadelphia are for Classes A and B according to the Code; Class C is slightly less.									

Normandie Will Commence Service Next June

Announcement has been made by the French line that the superliner NORMANDIE, designed to be the world's largest and fastest ship, will sail on her initial voyage from Havre June 1, 1935. She will make her first appearance in New York harbor four days later.

Latest information indicates that the NORMANDIE's tonnage will be 75,000 gross tons, possibly as high as 78,000 and that she will be 1027 feet in length overall. An average speed of 32 knots is anticipated. At this speed she can cross the Atlantic in four days.

Her extensive sea trials are set for late this year or early in 1935. Progress in completing the new liner at the Penhoet shipyard at St. Nazaire, France, is being made according to schedule. Had the work been rushed the new vessel could have been ready for operation this year, but due to conditions the work was purposely slowed up somewhat with the view of placing her in service next year when it is expected that travel will be much improved.

Assurances have been made to the French line that terminal facilities in Manhattan will be ready before the vessel is completed. It is understood

that the French line has signed a lease with the city of New York for the new 1100-foot terminal to be known as Pier 90, Hudson river, at the foot of West Fiftieth street. Only the shed now remains to be completed to make the new terminal ready.

Japanese Motor Liners

Word has been received that the Nippon, Yusen, Kaisha line is constructing a fleet of six express cargo motorships for the Japanese New York service. These vessels are to have a speed of 18½ knots and they will therefore be among the fastest cargo ships afloat.

First of these vessels, it is expected, will enter service next September to be followed at regular intervals until the last which is to be commissioned in March, next year.

The vessels are to have a length of 446 feet and a beam 62 feet with a gross tonnage of 7300. The total carrying is to be nearly 14,000 tons. Cold storage space will be available for 200 tons of cargo.

That the Japanese are taking the lead in the development of fast cargo liners is evident. The new cargo motor liners commissioned early this year by the Mitsui line, the AZUMASAN MARU and AMAGISAN MARU, attained a speed of nearly 20 knots on their sea trials.

Bids Are Requested by U. S. Engineers

Bids will be received until noon on July 16 by the office of the division engineer, corps of engineers, United States army, 707 Postal Telegraph building, Kansas City, Mo., for furnishing 240 pieces 28-inch inside diameter pipe, 12 feet, 10 inches long, ¼-inch plate and 500 pieces 28-inch inside diameter pipe connecting links for the Fort Peck dredges.

The same office will receive bids until noon July 9 for the construction of a steel sheet cut-off wall for Fort Peck dam.

These notices were issued for the division engineer by Capt. Theodore Wyman Jr., corps of engineers, assistant to the division engineer.

Bids will be received until June 28 by the United States engineer office, Memphis, Tenn., for furnishing and delivery of 120,000 pounds of ¾-inch galvanized steel wire strand to the supply and repair depot, Bridge Junction, Arkansas, with alternate bids on the same material f.o.b. contractor's plant.

Bids will be received up to 2 p.m. July 6 by the United States engineer office, Memphis, Tenn., for leasing one or two dredges and dredge tenders. Full information may be received on application.

New Cruiser Minneapolis Commissioned

ONE of the latest of Uncle Sam's new fighting ships, the U. S. S. MINNEAPOLIS, thirteenth to be laid down of the 18 heavy cruisers permitted the United States under provisions of the Washington and London naval treaties, was completed at the United States navy yard, Philadelphia and placed in commission as per sched-

yard on her shakedown cruise.

During the shakedown cruise the MINNEAPOLIS will make a trip abroad. In the fall she will return to the Philadelphia navy yard to be prepared for final trials. These trials will be held under the supervision of the board of inspection and survey, and will probably take place sometime in Oc-

tober. After completion of any work which may develop as a result of the trials, the vessel will join the fleet as an active unit of the cruiser force.



U. S. S. Minneapolis, built at the United States navy yard, Philadelphia. Successful builders' trials began on May 28

ule on May 19. On May 28 she left the navy yard on a four-day builder's sea trial off the Delaware capes. Upon completion of the sea trial, which was entirely successful, she returned to the navy yard at Philadelphia for the installation of certain equipment delayed by late delivery of material. On June 20 she sailed from the navy

yard on her shakedown cruise.

Contract for building the MINNEAPOLIS was signed on July 12, 1929. Her keel was laid June 27, 1931. She was launched on Sept. 6, 1933.

The MINNEAPOLIS has a standard dis-

placement of 10,000 tons. Her length overall is 610 feet; length at waterline, 578 feet; beam, 61 feet, 10 inches; and mean draft, 21 feet, 7 inches. Her armament consists of nine 8-inch main battery guns, arranged in three triple mounts. In commission she will carry four planes, two mounted on catapults and two in hangars aft. Her speed is about 32.5 knots.

Complete engine room propelling equipment for the MINNEAPOLIS was supplied by the Westinghouse Electric & Mfg. Co. Geared turbines at a total of 107,000 horsepower drive four propellers giving the ship a top speed of 33 knots.

Westinghouse propelling machinery is also fitted on the heavy cruisers NEW ORLEANS and SAN FRANCISCO, both of which are on their 10,000 mile shakedown cruises, the former enroute to Copenhagen and the latter on her way to Australia, while still another cruiser, the U. S. S. ASTORIA, building on the Pacific coast will be ready for sea around July 1.

The MINNEAPOLIS is in command of Capt. Gordon W. Heines, U. S. N. The executive officer is Commander John R. Beardal, U. S. N. She will carry a total of 34 commissioned officers, nine warrant officers of a crew of 551 men.

Equipment Used Afloat and Ashore

Gas Lift Truck—Welded Cylinders—Feed Pumps—Acetylene
Generator—New Diesel Engine—Tailgate Elevator

THE accompanying illustration shows a three-ton gas operated industrial lift truck recently developed by The Elwell-Parker Electric Co., Cleveland. For more than 25 years this company has built electric trucks and more recently gas-electric trucks. With the straight gas trucks now completing the range of power, it is possible to select the kind of power and the type of machine best qualified for the work.

In developing the new gas truck utmost care has been taken in engineering design and in exhaustive trials under service conditions. Combined with simplicity of design a number of advanced features have been incorporated to adapt the new unit for specific services.

The controls, for example, are within easy reach of the operator's right hand while the dials and indicators are immediately before him on the instrument board. A single pedal controls both the brake and the clutch. Pressing down on the pedal, releases the brake and engages the clutch. Releasing the pedal, automatically disengages the clutch and then applies the brake. The brakes are set the instant the operator steps off the platform or lifts his foot. There is also a further protection, especially when the loaded truck is standing on grades, by a transmission gear lock.

The hydraulic type of hoist mechanism on this truck receives fluid under pressure from a pump driven directly by the motor. The cylinder through a balanced lift, elevates the platform, mounted on rocking links.

Extra clearance beneath the platform has been provided by placing the hoisting cylinder high in the truck.

Unusually rapid pick-up and ample power, under instant control, for operating emergencies such as climbing steep ramps, are characteristics of the new trucks. The design is rugged and the truck has stability of travel, combined with quiet performance.

Arc Welded Cylinders

SOMETHING new in the construction of diesel engines is being tried out by F. B. Stearns, Cleveland. An experimental diesel engine for marine use is being built with arc welded cylinders.

To save weight and space, arc welded steel is being used for cylinders and other parts. The cylinders under construction are for a 320-horsepower diesel engine operating at 1300 revolutions per minute.

The welding was done by The Thornton Co., using welding machine best qualified for the work.

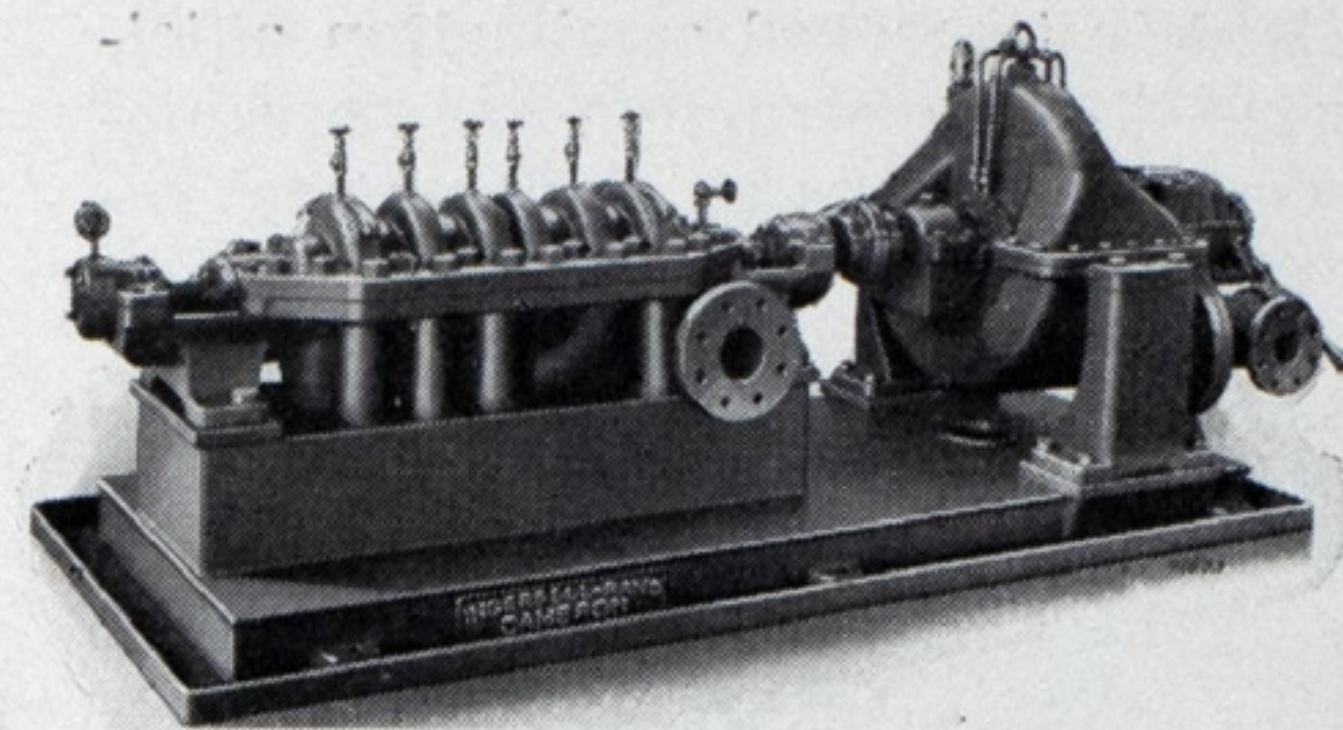
Boiler Feed Pumps

MULTI-STAGE centrifugal boiler feed pumps of the Cameron type, for pressures up to 600 pounds, are manufactured by Ingersoll-Rand Co., Phillipsburg, N. J.

An interesting feature of this type of pump shown in the accompanying illustration is the hydraulic balance obtained by placing an equal number of impellers back to back.

This arrangement eliminates high pressure stuffing boxes. Of the two stuffing boxes used, one is under second stage pressure, the other is under suction pressure.

The casing of the pump is split horizontally, allowing the entire ro-



Multi-stage centrifugal pump

tor to be removed from the pump without disturbing bearing adjustments, exposing bearings to contact with dirt or moisture, or disconnecting any part of the piping.

New Acetylene Generator

A NEW type of portable acetylene generator has been developed by the Linde Air Products Co., 30 East Forty-second street, New York. It is intended for portable service only, and is designed to withstand the abuse encountered in such service. With a carbide capacity of 150 pounds, the new generator is especially serviceable wherever large scale welding operations must be carried out on the job.

The generator is listed as standard by the Underwriters' Laboratories Inc. It is rated to produce 300 cubic feet of acetylene per hour, and weighs 750 pounds empty. It is 87 inches in height overall and 42 3/4 inches in diameter. Fully charged, the generator weighs 2250 pounds.

The feed is of gravity type. The mechanism is of an advanced design. The feed control unit is self-contained and is bolted to the inside of the carbide hopper. The feed valve unit is actuated by a diaphragm. Pressure on the diaphragm is exerted by a house and loaded spring unit. The spring is encased in a small housing and set at the factory to deliver about 13 pounds per square inch pressure. This can be changed within a range of about two pounds per square inch by an external adjustment. The set pressure feature does away with the necessity of setting the pressure when the machine is started.



New type 3-ton gas operated industrial lift truck

Diesel Engine Developed, Opposed Piston Type

TO REDUCE weight and dimensions, the Fairbanks-Morse & Co., 900 South Wabash avenue, Chicago, has developed a new opposed piston diesel engine. This engine is now being shown, for the first time, at the company's exhibit in Chicago at A Century of Progress.

The weight of the new engine has been brought down to 20 pounds per horsepower. At the same time improved scavenging and a greater virtual stroke to bore ratio has resulted in improved combustion efficiency. The construction has been materially simplified by a substantial reduction in the number of parts.

The new engines have been designed primarily for installation where weight and space are factors of importance, as in marine and mobile equipment. They are, however, equally adaptable for stationary work. Because of the light weight and compact yet sturdy construction, these engines are particularly adapted for all classes of marine work including tugs, lighters, cargo and passenger vessels and pleasure craft.

An engine of opposed piston type is inherently balanced because the reaction forces of the two pistons in the cylinder oppose and tend to counteract each other. This makes for higher rotative and piston speeds with consequent reduction in weight.

The new engine has two short, large diameter crankshafts with a synchronizing connection which gives compactness. The three functions of regulating injection timing, pressure and quantity are centered in a single lever. Response is rapid and

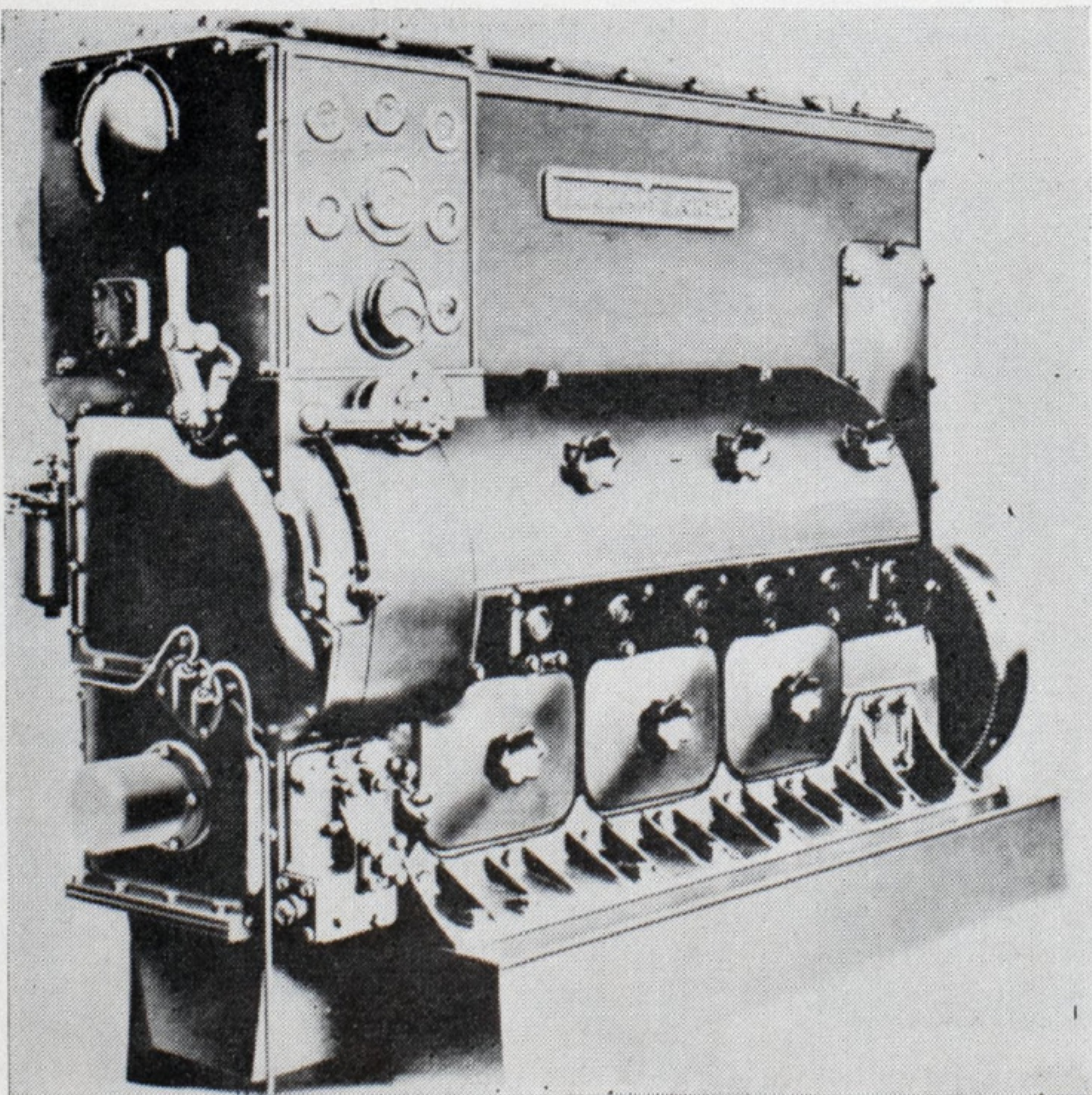
accurate, and the engine may be changed from idling to full speed in only a few revolutions or it may be maintained indefinitely at any intermediate speed within narrow limits.

Elimination of cylinder heads, by confining the combustion space between the two pistons, not only improves combustion, but also allows better cooling facilities at this point as well as eliminating the necessity for gaskets. The frame is of rigid lightweight construction which together with the use of aluminum for parts not subjected to stress makes for extreme lightness with no reduction in strength. All water and oil piping is permanently tight as are also the intake and exhaust manifolds. Built-in duplex rotary scavenger blowers are provided and the uniflow principle of scavenging is employed. Other built-in auxiliaries including lubricating oil pumps, fuel oil service and transfer pumps and circulating water pumps. These engines are available in five-cylinder sizes, and in 6, 7 and 8-cylinder combinations, with a 5-cylinder size in the smallest bore. Power capacities range from 50 to 300 horsepower per cylinder or for the engine, from 250 to 2400 horsepower.

Bids were received until June 29 by the United States engineer office, Memphis, Tenn., on furnishing and delivering approximately 1,000,000 preformed noncorrosive twist wire.

The same office received bids until June 29 for furnishing six motor-driven units and control equipment for marine ways at the supply and repair depot of the United States engineer's at Memphis, Tenn.

Bids will be opened on the same date by the same office for various items of machinery for marine ways.



New two cycle, opposed piston diesel engine of lightweight and compact construction, recently developed by Fairbanks-Morse & Co. for marine, railway and stationary installations

Power Elevator Tailgate For Motor Trucks

A POWER elevator tailgate has been developed for commercial vehicles by the Davey Compressor Co. Inc., Kent, O. It is known as the Davey-Troell power elevator tailgate and is used for handling loads in or out of a truck or van without manual labor.

The accompanying illustration shows one of these tailgates in lowered position. The tailgate and its mechanism are in effect a power elevator operated by a take-off from the truck motor. The device is mounted in a welded frame of structural steel and comprises the rear end of the truck or van body. It can be built into the frame when a new body is being constructed, or can be quickly installed in an old chassis by any commercial body builder. It can be designed to fit



Power tailgate for truck

any type of body of any make of truck.

This power elevator tailgate is driven by a worm gear which in turn is actuated by the truck motor drive shaft. The worm gear has a ratio of about 40 to 1 and the unit requires from 1 to 2 horsepower for the handling of full loads on the elevator tailgate.

Two drums near the center of the truck chassis, controlled by a shaft from the worm gear, operate cables leading to rams in vertical sliding grooves. These rams raise and lower the tailgate; and their performance is such that the entire cycle of raising and lowering is under the operator's complete control at every instant.

Experience indicates that this method of unloading and loading trucks will eliminate much loss from breakage or damage to merchandise due to dropping; also that its use will protect workmen against injuries which may be caused by heavy lifting or straining. This device should prove of special value on steamship piers and docks in speeding up dispatch and consequently reducing congestion. It will be a distinct advantage in both loading and discharging trucks.

Bids for Leasing Pier, Army Base, Boston

Bids were opened on June 11 for leasing the army supply base at Boston for a period of five years beginning Aug. 3, 1934. The following bids were received: Waterfront Terminals Inc., Boston, \$44,728 per annum; Piers Operating Co., Boston, \$55,711 per annum.

Before further action is taken by officials of the shipping board bureau the bids will be analyzed and the financial responsibility of the bidders will be considered. A final decision is expected shortly.

The Boston army supply base, one of the large terminal properties under the jurisdiction of the shipping board bureau, is now operated by Boston Tidewater Terminal Inc., under a lease which has been canceled by the secretary of commerce as of Aug. 2, on the grounds that it was entered into without due advertising and competitive bidding, and with the further object of securing a revaluation of the rental value of the property.

The old lease provided that the amount of rental should be 25 per cent of the gross revenue, whereas the new lease stipulates that rental will be at a fixed monthly rate payable in advance.

Selecting Board Director

Daniel C. Roper, secretary of commerce, in considering the appointment of a permanent director of the United States shipping board bureau to succeed Henry H. Heimann, has asked Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Co., and Edward P. Farley, chairman of the finance committee of the American Hawaiian line, to suggest the names of six men each from which the secretary might make his selection.

James Craig Peacock has been serving as acting director of the shipping board bureau. The secretary, however, is anxious to secure as director a man who has had practical shipping experience. Prominent mention has been made of Thomas A. Scott of the Merritt Chapman & Scott New York.

Intercoastal Investigation

James Craig Peacock, acting director of the shipping board bureau, recently announced that the hearing scheduled to be held in New York, June 21, known as the intercoastal investigation, has been postponed until July 12. The purpose of this inquiry is to establish a basis of facts regarding conditions in the intercoastal trade with the view to

promoting greater stability. Sixty-two carriers have been named as respondents and have been notified to appear.

Time for filling in replies to a questionnaire sent to respondents was extended to June 27, and for filing briefs to Aug. 13. The questionnaire is intended to develop information relative to receiving, handling, storing and delivery of freight. This information when received will be open to public inspection at the shipping board bureau until the close of business on July 10.

United Licensed Officers'

On June 1, the United Licensed Officers' association, the largest organization of licensed ship officers in the United States, celebrated its first anniversary. It comprises in membership about 75 per cent of the licensed personnel sailing out of New York, and is planning the establishment of an office in the West Gulf area.

Boston Shows Traffic Gain

The duties collected in the Massachusetts customs district during April amounted to \$1,321,710.44, an increase of \$454,924.66 over April last year. For the ten months of the fiscal year ending April 30, the duties amounted to \$23,492,654.88, a gain of \$8,859,658.38 over the corresponding 10 months last year.

The exports for January and February for the Massachusetts customs district were valued at \$3,976,631, against \$1,438,365 for the same two months last year, an increase of \$2,538,270. The increase was chiefly in cotton, foodstuff, and re-exported wool.

Depreciation Allowed

A decision by the United States board of tax appeals in the case of the American South African Line Inc., is of importance to shipping men generally in the matter of allowable depreciation of vessel property. Whereas the internal revenue service as a part of the general policy of collecting taxes to the fullest extent possible, sought to assess the South African line on a basis of 3 per cent depreciation annually, the court decided on 4 per cent for five vessels and 3½ per cent on the sixth. The vessels involved are combination passenger and cargo ships.

The treasury department has issued new regulations with reference to allowing depreciation. These regulations are now effective for returns to be filed and also to all returns already filed and not yet audited or closed.

Los Angeles Foreign Trade Shows Big Increase

The month of May continued to show large increases in foreign trade at the port of Los Angeles over the same month in 1933. The gain was greater than in any previous month this year. Value of exports for the month of May aggregated nearly \$7,250,000, compared with \$4,487,000 in May, 1933, an increase of more than 60 per cent. Imports increased from \$1,802,000 in May, 1933, to \$4,682,000 in May of this year, an increase of more than 158 per cent.

This was the largest export month southern California has experienced since July, 1931, and the largest volume of imports since January, 1931.

Exports of cotton amounted to more than \$1,200,000. Of this amount Japan alone took over \$1,000,000 worth of raw cotton from Los Angeles harbor. Citrus fruits also amounted to more than \$800,000 in export value.

Shipments of oil for the month of May were a half million barrels more than in May of last year, but were considerably below the total for April of this year.

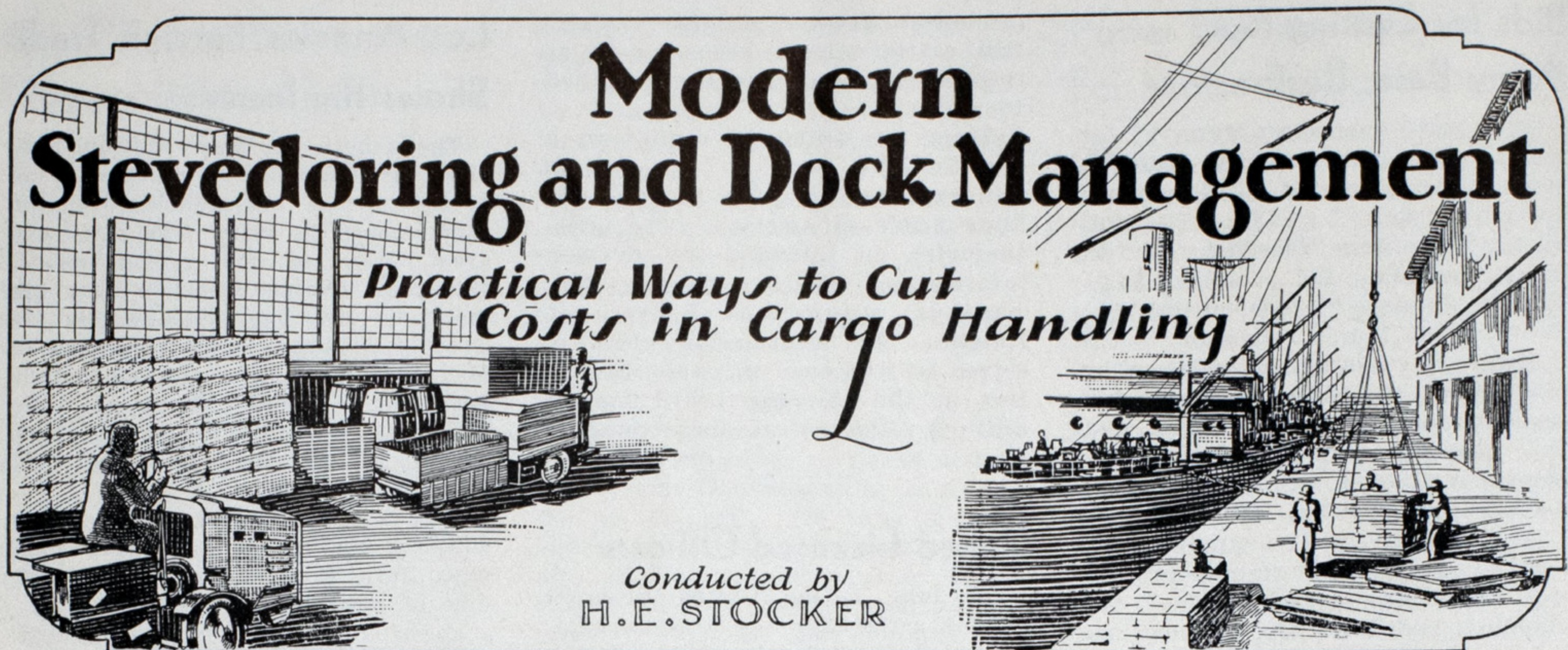
Lumber receipts were only a little more than half of those of April, and amounted to only 20,000,000 board feet because of the longshoremen's strike. Ordinarily lumber comes into this port at the rate of 1,000,000 board feet a day, but due to the strike not a lumber vessel arrived in more than ten days during the latter part of May.

Traffic at Baltimore

A very marked improvement in exports and imports for the first four months of this year, as compared with the same period last year, is noted at the port of Baltimore. For the first four months of this year, the export totaled \$13,206,806 as compared with \$5,620,124 for the same period last year. The imports for the first four months of this year totaled \$18,086,867 as compared with \$12,003,261 for the first four months of 1933. Total exports and imports for the first four months of this year amounted to \$31,293,673 as compared with \$17,623,985 for the same period last year.

During the month of April, 1934, the number of vessels in foreign, intercoastal and coastwise trade entered at the port of Baltimore, was 226 as compared with 218 for the month of March, and 172 for April, 1933.

Of the arrivals during April, 155 vessels were of American registry; 25 British; 22 Norwegian; 7 Japanese; 4 Danish; 4 Swedish; 3 Honduran; 2 Dutch; 2 Panamanian; and one each Brazilian and German.



Analyze Your Cargo Handling Problems for Improved Operation

By H. E. Stocker

SO MANY considerations are involved in the solution of the problem of obtaining maximum economy in cargo handling at any terminal, that it is impossible to give a definite answer without a thorough analysis in each instance.

Governing conditions vary so widely on different terminals that the economic solution of one operation cannot be used as the solution of another, although both may be in the same trade and many conditions may be similar. A difference in the size of the terminal only may have an important bearing upon the selection of methods and equipment. In one case, considerable expense was necessary to pile bags of rice and flour more than man high. The stevedore endeavored to reduce this excessive expense by utilizing agricultural type tractors, fitted with cranes, also conveyors, but the terminal was so badly congested, that it was found impossible to use this equipment to best advantage.

Conditions Must Be Considered

Each set of conditions—terminal, ships, character of cargo, schedule requirements must be considered separately to arrive at a wise and truly economical solution.

Experience in cargo handling alone is not sufficient for the most profitable solution of cargo handling problems—ability and experience in analyzing problems is essential to obtaining the best results. The work of a man possessing an analytical

mind, even one who knows nothing of the technique of the business, is frequently of remarkable value.

The ablest executives are eager for new ideas and information, realizing that rate of growth in business is the rate of ability to obtain, absorb and adapt information. This is true of the natural born leader, because ideas and facts are important weapons with which he works. And it is especially true of modern developments in business management. Understanding of the effect of fatigue and lighting conditions on production of employees, the use of a flexible budget for controlling costs, time and motion technique are to a modern business man as machine guns, gas tanks, and aircraft are to the modern general. Napoleon, or Julius Ceasar, with all their genius for "management" of warfare, would not fail to use the modern weapons available with which to get the best results from their "managerial" ability.

Experience is vital in management of cargo handling operations. For example experience in handling labor is something which cannot be learned in college or from reading books; experience alone will supply a man with the understanding of men and conditions which will bring success. However, experience has limitations which the analytical method is designed to correct.

In earlier times, when the facilities at the command of business men were much more crude, the individ-

ual experience of a business man was practically his only guide. If he did not have experience in handling a problem, he usually bungled it.

"Experience is a great teacher" but the personal experience manner of learning when depended upon entirely, is the slowest and most costly method. It is blind, slow moving and wasteful of time, money and effort. Under modern business conditions, complications are numerous so that the ground which an executive of first rank is expected to cover is so great that he would need fifty years experience before he could possibly be ripe for his position. Furthermore, even with fifty years experience, in many cases the chances are that his mind comes out of the experience, not with ripe wisdom, but filled with prejudice, lack of balance over development in one direction, under development in another and other limitations on reaching sound judgments in the many matters of policy and action which arise in the conduct of a shipping company.

Have Problems Analyzed

These limitations can be corrected at least in part, by the employment of men who are thoroughly trained in the analytical method of attacking a problem. Any organization can well afford the employment of a man of this type. Small organizations can employ them on a consulting or part time basis; large organizations can well afford to employ a

man of this type, if only to keep cargo handling methods up to the most effective standard by keeping the operating executives of the organization fully and promptly informed of new developments of methods and equipment; within and without the organization. If this is not done, there is the likelihood of obsolescence in methods and equipment through the progressive developments in cargo handling.

Recent developments in the use of fork trucks and cleats have made obsolete operations which were previously satisfactory. A tractor trailer operation was improved by loading the trailers a cleat load at a time, instead of loading it a case or bag at a time, without the aid of mechanical equipment. Many operations can be similarly improved.

Frequently, uneconomical operations can be improved without capital expenditure. They are chiefly wastes due to faulty methods of operation. Further improvement can be made by replacing antiquated equipment with that of modern design. However, decisions on the purchase of equipment must be based upon careful study to make certain that the new equipment can be effectively used for improving the economy of operation. The cost of the equipment and the carrying charges must be considered. Carrying charges usually represent a minor item in the purchase of such equipment as tractors, trailers, fork trucks, skids, etc. But these charges become very important items in the purchase of large dock cranes and extensive conveyor systems; also in large expenditure for changes in terminal layout made with the objective of reducing cargo handling costs.

A Research Organization

An adequate research organization provides executives with the "machinery" to combat many of the diseases that limit the profit of a company. One of these diseases is waste of money expended because of lack of adequate knowledge of that which has been done before in reference to the specific problem involved. The design of a new trailer or a skid without thorough knowledge of the reasons for previous designs, has frequently resulted in a loss of time and money. The designers gave a great deal of attention to designing trailers or skids which they thought were of the most effective type in every respect. The difficulties arose from the fact that they were not familiar with the reasons for certain details of design which were the out-growth of many years study by men who had been building equipment for ten to fifteen years.

A thorough analytical study of an operation will show the present cost per ton, and also show with a small margin of error the average costs

per ton with new methods and equipment. For example: A thorough analysis of the Cleveland & Buffalo Transit Co. operation at Cleveland resulted in an estimate of \$.5081 cost per ton of handling cargo, as compared with an actual cost after new methods and equipment became effective of \$.4975 per ton. Thorough analysis of cargo handling operations are examples of the application of the scientific method to terminal operations. Taylor, the "father" of scientific management once said that scientific management was 75 per cent analysis and 25 per cent commonsense. Another authority, Copley, said that science seeks not merely the facts, but *all* the facts.

The Scientific Method

The scientific method may be outlined as follows:

1. Analysis: Determination of the possibilities and the methods for improvement. Logical reasoning, however dignified and high-toned, is of small value unless verified by analysis and observation of facts. It is curiosity and not logic, that gets us the truth.

2. Experimentation: Checking proposed plans for improvement. A little of experimentation is worth more than much argument or opinions.

3. Systematic recording of facts: Memory alone or haphazard records are not sufficient. Complete and accurate records, intelligently devised and prepared, are important to progress and avoiding waste of time and money.

4. Standardization: That which analysis and experiment gain, standardization holds.

5. Control: Directs effort toward goal fixed by standardization.

In all work, but particularly in research work, it is important to distinguish between "actual" facts and so-called facts "pulled out of the air" which are pure guesswork. Some executives will go to the extreme of arguing as to what a fact is when a few minutes investigation would determine the fact exactly.

Much can be gained by utilizing the experience of other industries. A significant statement was recently made by Ralph Budd, president of the Burlington, in an article in the *Traffic World*, with reference to the Burlington Zephyr, "The fields of automotive, aeronautical, and marine engineering all contributed to the creation of the new train. The phenomenal advancements in motive power, metallurgy and welding that had been made in those fields led Burlington officials in 1932 to investigate the possibilities of adapting those advancements to railroad equipment."

By the same token, knowledge of the accomplishments in materials handling in other than the trans-

portation industry may be made productive of improvements in cargo handling.

A continuing thorough study of the methods of handling freight under all varieties of conditions would avoid many of the mistakes made by executives responsible for methods and equipment used on terminals. Most operating executives are too busy with operating duties to do the amount of analyzing on cargo handling operations necessary to the most economical operation. This work can be performed well only by a trained assistant who devotes all his time to this duty.

The research worker of proper qualifications will invite rather than resent criticism. His conception of the job should be to find "the one best way" for every operation and to accomplish that objective he must not build a wall around himself to keep out criticism. Constructive criticism is of the greatest benefit in determining "the one best way."

Financing research work need not be difficult if it is started in a small way and permitted to grow by paying for its growth out of financial results accomplished. In a shipping company, a relatively small sum invested in research will be repaid quickly. Under present conditions it is not a question of that which can be afforded for research, but rather that which cannot be done without it—if costs are to be kept down.

Italian Line Passengers

The Italian line has released the following information on the number of passengers carried in recent sailings of its vessels:

The REX arrived in New York on May 24 from Naples, Genoa, Nice and Gibraltar, with a total of 998 passengers in her four classes. She sailed May 26 from New York on her return trip with a passenger list of 1625 in all classes.

The CONTE DI SAVOIA arrived on June 7 with a total of 1019 passengers, and sailed for Gibraltar, Naples, Nice and Genoa from New York on June 9 carrying 1525 passengers in all classes.

When the VULCANIA arrived in New York on May 31 from Mediterranean ports, she carried 673 passengers. She sailed from New York on June 2 for Gibraltar, Algiers, Naples, Palermo, Patras, Dubrovnik, Venice and Trieste.

The Hamburg-American liner, New York, arrived in New York, May 25 from Hamburg, Southampton, Cherbourg and Cobh, docking at Pier 84, foot of West Forty-fourth street. The NEW YORK is the last of the four "BALLIN" type ships to be rebuilt with a new bow. Some 40 feet were added to the length of the vessels, and an appreciable saving in fuel was effected.

Stockton, Now an Ocean Port Expects Rapid Growth

By C. O. Burgin*

ALTHOUGH Stockton, Calif., is 88 miles inland from the sea, it has joined the ranks of maritime cities. Waterborne commerce is not an innovation to Stockton for her first regular carrier was the tiny sloop MARIA, in 1848, owned by Captain Weber who founded Stockton seven years before that.

Modern business, however, demands modern transportation facilities. The present ship channel, completed in February, 1933, known as the Stockton ship channel, permits 85 per cent of the vessels plying the Pacific coast to dock in its fresh water harbor. Its course is through the waters of San Francisco, San Pablo and Suisun bays, thence along the deepened and straightened San Joaquin river.

Through a comprehensive development of the port project there has been made available 10,000 acres of reasonably priced level water front industrial sites, all of which will be served by the public belt railroad, as well as an adequate net-work of truck highways. In this industrial area there will be 18 miles of water frontage on the main channel, and 24 miles of potential water front on the side channels.

Dock Facilities Developed

When the ship channel was completed the city had built 400 feet of open wharves and 937 feet of covered wharves. Additions to these facilities have been and will be made as requirements warrant.

The tonnage produced in the hinterland, tributary to the port, is principally agricultural and approximates 1,000,000 tons annually. The present annual inbound and outbound tonnage approximates 300,000 tons, in addition to agriculture products, and includes lumber, cement and petroleum products. The port of Stockton is served by three transcontinental railroads, the Santa Fe, Southern Pacific and Western Pacific and their connections. The highways which reach out of Stockton give promise that motor trucks will continue to play a large part in the progress of the port.

The rail lines, at the time the original surveys for the channel were made, had rates to and from Stockton lower than rates from and to San Francisco bay. However, the trucks, a few years ago, became formidable competitors against the rail lines, and in hauling the agriculture products from the val-

leys to the bay they did so at considerable lower rates than was charged by the railroads. As a result the railroads have consistently lowered their bay rates to meet this truck competition, and after several adjustments the rates dropped to a level below that enjoyed by Stockton.

While the trucks are operating from and to Stockton at substantially \$1 per ton less than they charge from and to San Francisco bay, the rail lines have not yet indicated a willingness to adjust the rates from or to Stockton to those charged by the truck companies at the present time.

During the period since the ship channel facilities were opened on Jan. 4, 1933 to March 1, 1934, 204 vessels of all classes have called at the port. Last year 300,000 tons passed over the docks at Stockton. Of these 300,000 tons handled, 37,940 tons were discharged from vessels and 48,448 tons were loaded aboard vessels operating on the high seas.

Different Trades Served

The following is a segregated list of where these tons came from and where they went to:

	In	Out	No. of Vessels
Coastwise	30,402	13,983	97
Intercoastal	5,732	32,997	38
Transpacific and South America.....	1,806	1,468	4
	37,940	48,448	139

In the first two months of 1934, Stockton handled 54,000 tons over the docks both in and out.

The number of vessels calling has increased rapidly. For instance, during the first half of 1933 there were 26 vessels and during the last half 113. Stockton as an ocean port celebrated its first anniversary last February, and a review of the year's work shows that its budget was well taken care of by earned revenues.

The Stockton chamber of commerce in 1931 decided to make a survey of the amount of tons actually moving in and out of the great central valley of California. For obvious reasons it was not possible to make the survey a complete one in the limited time available. Tabulation of the partial data obtained shows the following tonnages received and forwarded by businesses and individuals in central California during 1931:

Tons of Freight	
Intercoastal	248,145
European	281,900
Transpacific	107,080
Coastal	167,939

It is to be expected that when more shippers and receivers of freight realize from actual experience the savings of one dollar or more per ton by the movement of their shipments through the port of Stockton, the annual tonnage through the port during the next few years will far exceed the estimated 1,000,000 tons per year.

Some Sources of Freight

Some of the potential tonnage will come from the following sources: large quantities of fertilizer materials, bones from South America; fish meal is brought in from Japan and Canada, quantities of bananas from Central America, oil cake, molasses and other fertilizers and feed ingredients are also brought in. During the year 1932 California imported 38,508 tons of drugs.

The fruit industry consumes some 18,000 tons of tin plate yearly. Throughout the territory served by Stockton are many canneries. These and the dried fruit industry furnish some 200,000 tons for water movement each year. The raisin industry furnishes approximately 50,000 tons for movement via intercoastal and foreign shipping. The largest packer of raisins in the world, the Sun-Maid Raisin Growers association, Fresno, Calif., has moved all of its raisins through the port since last summer. On every ton so moved \$1 is saved which makes a saving of \$18 on each carload. The port of Stockton will make a large saving for shippers of canned and dried fruits. Last year shippers of the valley were saved \$80,000 and this will keep increasing as business increases through the port.

The cotton industry extends from Kern county to San Joaquin county in the valley and has a ready market in Japan. In 1928, 14,000 bales; in 1929, 231,000 bales; in 1930, 246,000 bales; in 1931, 159,463 bales were produced. The drop in production in 1931 was due to price conditions. The government has loaned the port \$230,000 for building one of the most modern and complete cotton compresses in the west, and it is expected that 60,000 bales will be compressed at the port each year. This means that approximately one quarter of the California cotton crop will be handled.

The development of the rice growing industry in the Sacramento valley will provide additional tonnage for the port. Large quantities of condensed milk are exported to the Orient. Stockton promises to become one of the largest wine centers of the states.

In considering the future possibilities of Stockton as an ocean port it must be borne in mind that it not only has the harbor facilities, rail and truck connections, but it has the backing of a wonderfully productive hinterland and the trade. It has, within a radius of 50 miles, a population of 720,000 and within a radius of 200 miles, a population of 2,600,000.

*The author, C. O. Burgin, is traffic manager of the Port of Stockton, Calif.

Useful Hints on Cargo Handling



RICE is subject to absorbing taint and odor of other cargo stowed in the same compartment. It is, therefore, necessary to arrange special stowage for rice and see that only those commodities are stowed in the same compartment which are free from odor.

Rice is subject to heating and, therefore, requires ventilation, when any large quantities are shipped and passage ranges from 15 to 30 days in transit. This, however, is overcome by the installation of air ducts in the cargo. This matter is carefully watched by the representatives of the New York board of Underwriters, who, when advised that a cargo of rice is being shipped, carefully inspect the holds to see that they are free of weevils and other insects, and of oil odors from the bilges.

They also inspect the holds to see that they are clean, and that suitable dunnage is laid, so that cargo will have room for ventilation on the ceiling, and that it is not permitted to come in contact with the steel stanchions or ship's side.

When the rice is floored off five or six tiers deep, air ducts, made up of 1 inch x 6 inch material, separated so that a trunk of about ten inches wide is developed, are laid fore and aft and athwartships through the holds so that any excess heat can be conveyed to a vertical section of the duct and then through the ventilators into the compartments above. In this manner, by having ducts located about five tiers apart, it has been possible to deliver in good condition rice cargoes loaded in the Gulf.

The 100-pound packet of rice is a package which permits easy and quick handling, and does not overload or stress the material of which the bag is made. It also aids in delivering good salable cargo. Rice, while not as heavy as bulk cargo, stows in about 55 cubic feet per ton, making excellent weight cargo when combined with cotton, lumber and other light materials.—*Lykes Fleet Flashes.*

Air-Conditioned Holds

STUDY of stowage of apples has disclosed that more than 13 per cent carbon dioxide gas content of the air in the hold will cause deterioration of the fruit. A small amount of carbon dioxide acts as a preservative. Experiments in England indicate 7 per cent as the

THIS page is being devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

correct amount. To obtain this amount of gas in the air, the air in the experimental hold was exhausted, and new air admitted with the exact amount of carbon dioxide gas needed for the best protection of the fruit.

Ships have been constructed with air-tight holds for carrying perishables from Australia with the air in the holds conditioned as described above.

Uncrated Automobiles

AN AUTOMOBILE fastening device has been designed to secure unboxed automobiles on board a steamer without the use of lumber, and to provide a safe fastening which will entirely eliminate all danger of cars becoming loose or chafing during a transatlantic voyage. It has been in use on Black Diamond line's steamers for more than a year and a half, and during this period not a single complaint has been received and not a cent in damage claims has been paid although a very large number of automobiles has been carried to Europe during this period.

The device, which was originated by M. J. Hanlon, vice president and operating manager of the Black Diamond lines, consists of a cast steel deck fitting permanently installed, watertight, in the bridge deck or 'tween deck plating, specially designed hooks equipped with a right and left hand thread, and a chain provided with a canvas protecting sleeve which surrounds the front and back axles of the car.

The chain is dropped into the claw hook and the turn buckle set up by hand, without the aid of a lever, resulting in the auto being securely fastened to deck of the steamer on its own wheels. No rolling or pitching has yet resulted in autos so fas-

tened ever shifting or becoming dislodged in the slightest degree. In the event that tires become somewhat deflated during the voyage it is a very simple matter to take up on the turn buckles.

Cars can be loaded and discharged rapidly and at much less expense as the labor involved is a minimum and the excessive cost of chocking lumber is eliminated. The device can be transferred from one vessel to another as demands of traffic dictate. Another important advantage is that automobiles may be stowed 'thwartship with perfect safety.

Handling Strongbacks

THE M. S. ANNA MAERSK has a novel, effective arrangement for handling strongbacks. A device is provided which permits raising the beam about 2 inches after which it is rolled to the end of the hatch. The device for performing this operation consist of a flanged wheel, about 8 inches in diameter, which is fitted to an eccentric arrangement operated by a handle.

The device is fastened to the strongback by two clamps which are held securely in position by a set screw. By manipulating the handle after the clamps have been secured, the eccentric action causes the beams to be raised and then it is rolled to the end of the hatch, the flanged wheels rolling along the top of the hatch coaming.

Newsprint paper is stowed on end. If the deck is damp from other cargo such as beer in kegs, paper is spread on the deck before the paper is stowed. The paper used is that obtained from cars which bring the paper from the mill to the port. If wet cargo is to be carried in the same compartment sawdust is placed around the wet cargo to prevent the liquid from reaching the paper.

Executives often raise more of a fuss over small unimportant items than they do over more important items. Possibly it is explained by one old time shipping man—"When you make a mistake which costs the company a lot of money you feel as bad about it as I do, therefore I don't say much about it. I do criticize you severely when you make a small mistake because I am afraid that you might think that small mistakes are unimportant."

British Shipyard Completes Twin Screw Motorship

OFFICIAL trials of the twin motorship *INCHANGA*, built by Workman Clark (1928) Ltd. Belfast, for Andrew Weir & Co., London, to be used in the service from India and Burma to South Africa and Ceylon, were held March 19 and proved entirely successful. A speed of over 16 knots was obtained on the measured mile. This vessel is the second of three similar ships for this service. The first, the *ISIPINGO*, was completed late in February and the third, the *INCOMATI*, launched Feb. 15 has now been completed at the same yard.

In the design and construction of her hull and in equipment, the *INCHANGA* fully meets the requirements of the convention for safety of life at sea.

public rooms for the comfort of the passengers. Leading off the entrance hall is a large comfortably fitted lounge, which opens out into a glass screened terrace on each side. Facilities are arranged for the playing of deck games on the boat deck, which has been made as clear of obstructions as possible. On this deck is the smokers room, leading off which and overlooking the open air swimming pool, is the verandah cafe.

On the upper deck is the dining saloon which accommodates over 50 persons at small tables, enabling them to enjoy their meals in the privacy of their own party.

For ventilation and heating purposes a full "Pleno Unit" system of

an ice making plant is also included.

A Hele-Shaw electric-hydraulic 4-ram type steering gear is located in a compartment on the main deck aft. The gear is controlled by a telemotor from the wheelhouse, with an alternative steering position on the docking bridge aft.

Main Propelling Machinery

The main propelling machinery consists of two 6-cylinder, airless-injection, two-stroke cycle engines of the new Workman Clark-Sulzer design, the first of their type to be built in the British Isles. These engines will each develop 2400 shaft horsepower at 135 revolutions per minute. Scavenge air is supplied by a double-acting tandem pump driven off an extension at the forward end of the crankshaft.

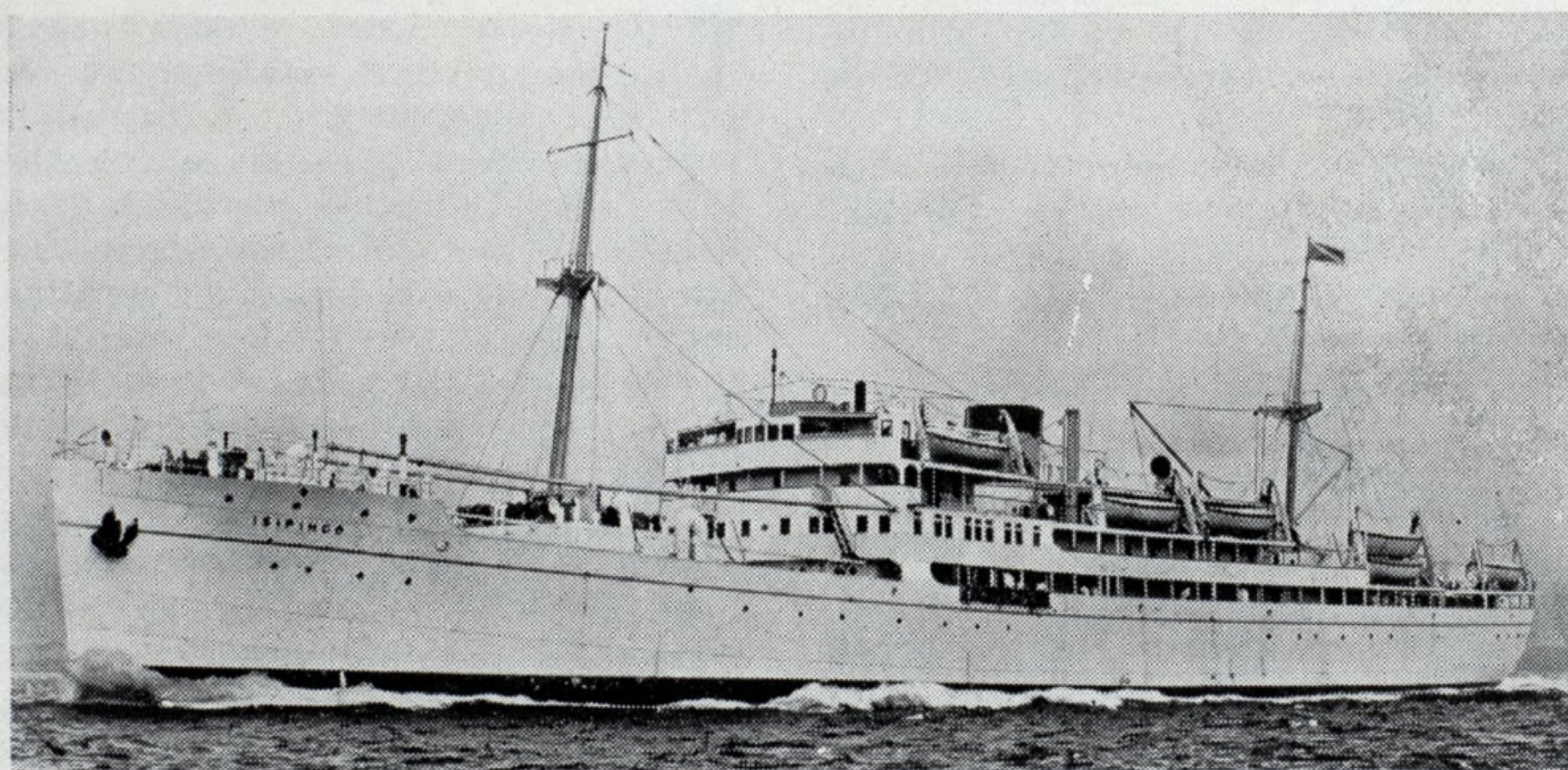
Each cylinder has its own direct injection high pressure fuel pump which is operated by cams on a common camshaft situated toward the top of the main frames and driven by a train of gears from the after end of the main crankshaft. Unlike earlier air-injection engines built by Workman Clark Ltd., there is no valve gear or shafting along the cylinder cover level, so that the top of the engine presents an exceedingly simple and clean design allowing the easiest access to the cylinders for overhauling.

The control gear is placed neatly and compactly at the forward end of the engine on the engine room floor level. There are two hand levers on top of the control gear pedestal, one for starting and the other for reversing and fuel pump regulation, the finer control of the latter being effected by a handwheel on the front of the pedestal. Starting and reversing operations are carried out very rapidly and efficiently, the former by a simple motion of the starting lever, and the latter with the assistance of a small three-cylinder air engine inside the pedestal, which, through gearing and a vertical shaft, turns a fore and aft control shaft in way of the fuel pump cams and thus swings the "ahead" or "astern" rollers across to their respective cam on the camshaft, according to the position of the reversing lever.

The third of these three sisterships, the *INCOMATI*, successfully completed her official trials on April 23.

The main propelling machinery of the *INCOMATI* consists of two sets of Doxford, opposed piston, oil engines developing together a total of 5750 shaft horsepower. On the measured mile run a speed of over 16 knots was obtained.

Four electric generating sets, diesel engine driven, provide power for all the auxiliary machinery. Steam is supplied by an oil fired Cochran vertical boiler working at 100 pounds per square inch pressure.



Isipingo—One of three similar twin screw motorships built by Workman Clark Ltd., Belfast, for Andrew Weir & Co., London

Her dimensions are: length, 435 feet; breadth, 57 feet; depth, 37 feet; draft, 25 feet, 3 inches; deadweight, 8000 tons; and gross tonnage, 7100. These ships are intended for uninterrupted service in tropical waters.

First class accommodations are provided for 50 passengers; the cabins being designed along the lines of those of the most modern transatlantic luxury liners, each cabin having a wash basin with hot and cold fresh water, and its own bathroom and lavatory adjoining. Two de luxe suites are located on the boat deck, which strike a very modern note both in treatment and color, a special feature being built-in beds of selected walnut. Accommodation for 20 second class passengers is provided in the poop. Arrangements are also made for the carriage of 500 native passengers.

Special attention has been paid to the design and furnishing of the

mechanical ventilation is installed, a special feature of which is the humidifying apparatus, thus ensuring a natural heat in cool weather and also a cool freshness on the hottest of tropical days.

In design the vessel is of closed shelter deck type with long fore-castle and large midship deckhouse in which is contained the passenger and crew accommodation.

Five large cargo holds are provided, No. 3 being arranged as a deep tank for the carriage of cargo oil. Ten derricks and ten winches are provided for working the five hatches, and all cargo handling gear is of the modern type. A warping winch is fitted just aft of No. 5 hatch. All auxiliary machinery is electrically driven, including winches and windlass. Space for the carriage of insulated cargo is provided to the extent of 17,000 cubic feet. Large insulated store rooms are provided for meat and vegetables, and

Up and Down the Great Lakes

Bulk Freight Heavy—Lake Levels—Ore Shipments—American & Canadian Grain—Coal—Supervising Inspector—Vessels in Operation

BULK freight movement on the Great Lakes so far this year is showing a remarkable increase over last year. According to Canadian government statistics, freight through the locks at Sault Ste. Marie, for May, 1934 amounted to 5,744,695 tons, as compared with 3,490,336 tons during May, 1933. Wheat shipments were lighter than last year by 6,668,297 bushels, or 23 per cent, but other grains increased by 3,572,831 bushels. Iron ores increased from 953,152 tons to 2,611,241 tons. Bituminous coal increased from 821,273 tons to 1,525,604 tons.

Freight through the Welland ship canal during the month of May this year broke all previous records for the same month in former years. The total freight movement for May this year was 1,287,121 tons as compared with 1,165,853 tons in May, 1931, the previous high May record, and 1,109,132 tons in May last year. Wheat was lighter than in 1933 by 148,570 tons, or 4,952,300 bushels, but all other grains were much heavier than last year. Bituminous coal increased by 152,244 tons. Iron ore increased by 33,448 tons. No iron ore passed through in May, 1933.

Total traffic using the St. Lawrence canals in May this year amounted to 978,625 tons as against 835,540 tons in May, 1933. Bituminous coal increased by 52,556 tons, gasoline by 30,197 tons, pulpwood by 26,471 tons, rye by 20,588 tons, oats by 19,029 tons, petroleum and oils by 14,906 tons, and iron and steel by 12,488 tons. Wheat decreased by 87,637 tons and flour by 8401 tons.

Tugboatmen's Strike

The anticipated prompt settlement of the strike of tugboatmen employed by the Great Lakes Towing Co. did not materialize. The men originally walked out on May 16 and 17 and returned to work on May 18 after accepting a proposal made by G. A. Tomlinson, president of the Great Lakes Towing Co., to abide by the findings of an impartial arbitrator to be selected by the national labor board.

H. Gilbert Francke was appointed as impartial arbitrator by the national labor board. Mr. Francke brought in his findings on May 31. The men did not accept these findings and walked out on June 1 and

2. As this is written a strike has been going on for three weeks.

The company takes the position that it agreed with the men to accept the findings of the arbitrator on all questions in dispute, including wages and hours of service. Its position continues the same. The company's proposal incorporated a guarantee of 200 days work in the year, at \$9 per day, for licensed men and an equal number of days per year at \$6.50, for firemen and linesmen. It was held by the arbitrator that the company's proposal would guarantee the greatest possible income for the greatest number and he recommended that the men accept this proposal. This the men refused to do.

May Lake Levels

The United States Lake survey reports the following monthly mean stages of the Great Lakes for the month of May 1934, determined from daily readings of staff gages.

Lakes	Feet above mean sea level
Superior	602.49
Michigan-Huron	577.86
St. Clair	573.44
Erie	570.35
Ontario	244.48

Lake Superior was 0.32 foot higher than in April and it was 0.12 foot above the May stage of a year ago.

Lakes Michigan-Huron were 0.22 foot higher than in April and they were 0.64 foot below the May stage of a year ago.

Lake Erie was 0.23 foot higher than in April and it was 1.76 feet below the May stage of a year ago.

Lake Ontario was 0.21 foot higher than in April and it was 0.84 foot below the May stage of a year ago, 1.78 feet below the average stage of May of the last ten years.

Passenger Lines Active

Several steamship lines operating out of Chicago have commenced operations earlier than usual this year, and advanced bookings indicate one of the most active seasons in a number of years. Reopening of A Century of Progress is an important factor in stimulating lake traffic. The Chicago, Duluth & Georgian Bay Transit Co. sent out its first boat June 8 from Chicago for northern ports, whereas for years the official

opening of cruises has come on June 21. The Chicago & Milwaukee Steamship line started services between Chicago and Milwaukee on June 24, while the Great Lakes Transit Corp. began operations from Chicago on June 30.

Heavy Ore Shipments

Ore shipments from upper lake ports during the month of May this year showed an increase of nearly 200 per cent over the month of May, 1933. In May this year, 2,630,578 tons of ore were shipped from upper lake ports, compared to 900,534 tons of ore in the month of May, 1933. No ore was shipped in April of this year. Therefore, the total shipment of ore for the season, up to June 1, 1934, was 2,630,578 tons, compared with 983,744 tons of ore for the season of 1933 up to June 1.

The increase in ore shipments during May this year over the month of May, 1933, amounted to 1,730,044 tons or 192.11 per cent. The increase in ore shipments for the season, up to June 1 this year, as compared with the same period in 1933, amounted to 1,646,834 tons, or 167.4 per cent.

The shipments of ore by rail from Lake Erie ports to furnace during the month of May amounted to 1,264,446 tons; making a total for the season up to June 1 of 1,680,671 tons. On June 1, 1934 the balance on dock at Lake Erie ports was 4,379,795 tons as compared with 4,906,953 tons on June 1, 1933.

American Grain Shipments

Grain shipments by water from Duluth from Jan. 1 to June 15 totaled 13,682,030 bushels, while receipts during the same period were 11,857,169 bushels, according to reports from the Duluth board of trade. Wheat led in shipments with 5,779,827 bushels, the movement of corn being 2,737,761 bushels and of oats 3,326,633 bushels. These compare with receipts of 8,191,858 bushels of wheat, 2,170,473 bushels of corn and 493,421 bushels of oats.

Shipments from Chicago to June 1 showed a decrease compared with last year, the water movement being 6,944,000 bushels against 13,150,000.

(Continued on Page 40)

Coal Shipments on Lakes Show Marked Increase

Bituminous coal shipments from Lake Erie ports for the present season up to 7 a.m., June 18, amounted to 9,583,387 net tons of cargo and 285,210 net tons of bunkers, or a total of 9,868,597 net tons. This is an exceptionally large movement as will be noted by comparing these figures for those of the same period in the years 1933, 1932 and 1931.

For 1933 the cargo coal moved in the same period amounted to 6,707,535 tons, and bunker coal, 175,254 tons, giving a total of 6,882,789 net tons. For the same period in 1932, cargo, bunkers, and total bituminous coal shipments were respectively; 4,908,087 tons, 117,642 tons; and 5,025,729 net tons. For the same period in the year 1931 the figures for bituminous coal shipments, in cargo, bunkers and total, were respectively; 7,309,698 tons, 226,472 ton, and 7,536,170 net tons.

The average shipment of bituminous coal each week for the five weeks ending 7 a.m. June 18 amounted to 1,265,823 tons of cargo and 40,067 tons of bunkers, making a total average per week of 1,305,890 net tons.

Anthracite coal shipments on the lakes for the season up to June 1, amounted to 194,215 long tons. For the same period in 1933 the amount was 29,266 long tons; for the same period in 1932, the amount was 59,347 long tons; and for the same period in 1931, the amount shipped was 157,151 long tons. The above figures on anthracite coal apply to cargo only as no bunkers are carried, only small quantities of anthracite coal being used on board ship for galley fires.

Capt. A. A. Morrison Made Supervising Inspector

On June 6 the United States senate confirmed the nomination of Capt. Alvin A. Morrison as supervising inspector of the United States Steamboat Inspection service for the ninth district, with headquarters at Cleveland. Captain Morrison's appointment was recommended by Senator Robert J. Bulkley of Ohio. The position of supervising inspector has been vacant for about two years since the retirement of Capt. N. B. Nelson, who had served beyond the regular retirement age by special temporary appointment.

For many years Captain Morrison has been in active service on the Great Lakes as a master of lake freighters. At the time of his appointment he was master of the steamer EDWARD N. SAUNDERS JR. of the Mid-

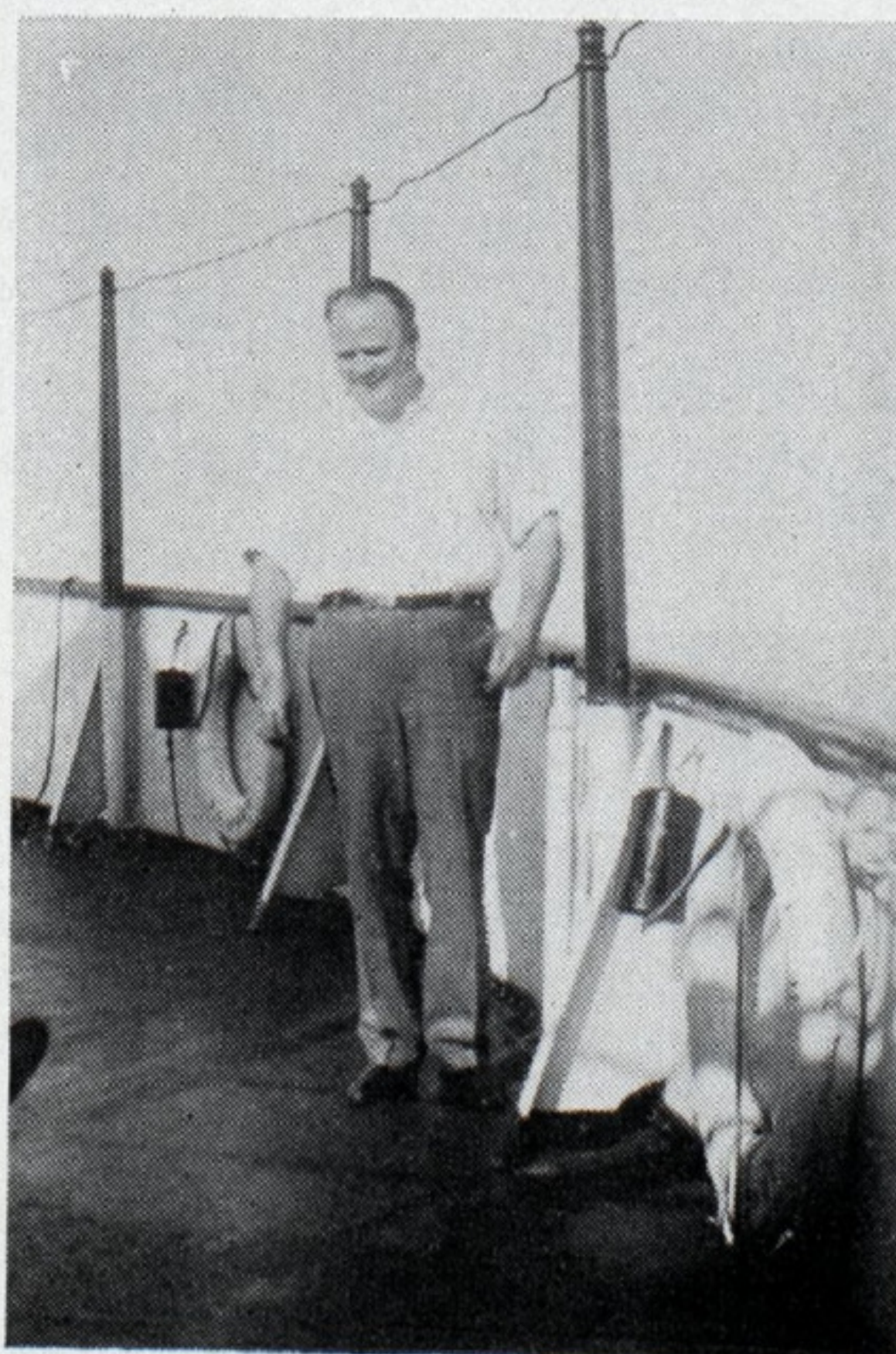
land Steamship Co. and continued in this capacity until his vessel arrived at Ashtabula, O., on June 25. He is a well known lake shipmaster and has had a long and creditable career. He also saw active service during the war as a reserve officer in the navy both ashore and on transport duty.

His early service at sea which began when he was about 15, was in Chinese waters, and later he served in the Philippines during the insurrection. He is about 54 years of age and was born in Canada.

His first command as master on the Great Lakes was the FRANCIS WIDLAR when he was about 26 years old. This vessel was managed by W. H. Becker. Later while still in his early thirties Captain Morrison was made master of the W. H. BECKER, flagship of the fleet. Except for his service during the war, he has been continuously in the employ of this company and of its successor the Midland Steamship Co.

While in command of the steamer EDWIN N. OHL, in August, 1917, he was called to active duty in the United States naval reserve. He first served as an officer on transports and was advanced to the rank of lieutenant commander. In the winter of 1918-1919 he was appointed presiding officer of the United States board of naval inquiry in Cardiff, Wales. This board had to deal with investigations of damage to cargo vessels due to strandings, collisions, and other maritime casualties.

Upon his retirement from the naval service in 1919, he returned to the Great Lakes and again took command of the OHL. In 1920 he became master of the ALEXIS W. THOMPSON, later renamed the W. H. BECKER and finally EDWARD N. SAUNDERS JR. and continued in command of this vessel until June 25 when he came ashore to assume his new duties.



Capt. Alvin A. Morrison

Number of Bulk Vessels In Service Shows Gain

Shortly after the beginning of navigation on the Great Lakes, as reported in the June issue of MARINE REVIEW, 60.67 per cent of the capacity of the bulk carrying fleet was in commission. This compared very favorably with the 27.88 per cent in commission at about the same time in 1933.

The feeling may well have been one of some uncertainty whether this comparatively large capacity would find continued employment. Now comes the encouraging report that not only has this large fleet been continued in operation but on June 15 the tonnage in commission had increased to 1,835,000 tons, giving a percentage of 66.76 per cent of the total capacity, an increase of slightly over 6 per cent over the capacity in commission on May 15, and an increase of 128.7 per cent over June 15, 1933.

From figures issued by A. B. Kern of the M. A. Hanna Co. on June 15, 1934, the trip capacity of American lake bulk vessels was 2,748,800 tons. Of this capacity, 1,835,000 tons, or 66.76 per cent was in commission. Of the 328 vessels available, no less than 205 were in commission on that date, representing 62.5 per cent. Of this number, 154 were engaged in the ore trade; while on June 15, 1933 only 40 vessels were engaged in the ore trade.

It is interesting to note the position of some of the fleets. Out of a total of 86 vessels, the Pittsburgh Steamship Co. had 43 in commission, all engaged in the ore trade. The Interlake Steamship Co., out of a total of 49 vessels, had 24 in commission, 12 of which were engaged in the ore trade. Hutchinson & Co., with 19 vessels had 18 in commission, 15 of which were in the ore trade. Cleveland Cliffs Iron Co. with a fleet of 21 vessels had all of them in commission, and all of them in the ore trade. The Bethlehem Transportation Corp., with 16 vessels, had 10 in service, all in the ore trade.

The M. A. Hanna Co., with a fleet of 10 vessels, had all in commission, and all engaged in the ore trade. The Wilson Transit Co., with a fleet of 11 vessels, had 10 in commission, one of which was engaged in the ore trade. The Reiss Steamship Co. had all of its nine vessels engaged in the ore trade. The Valley Camp Steamship Co., with a fleet of 8 vessels, had all in commission with none engaged in the ore trade. H. & G. M. Steinbrenner, with a fleet of 5 vessels, had four in commission with none in the ore trade. The Midland Steamship Co., with 6 vessels, and the Interstate Steamship Co. with 4, had all in commission, and all engaged in the ore trade.

Personal Sketches of Marine Men

Thomas F. Baker, President, Foreign Commerce Club, New York

By Ben K. Price

RECENTLY elected president of the Foreign Commerce club of New York, he is well known by shippers in both North and South America.

FOR thirty-one years he has been associated with an old New York shipping firm representing the best traditions of ocean shipping.

HE HAS launched a vigorous program to promote and to protect foreign commerce of the port of New York against all encroachments.



THE recent election of Thomas F. Baker to the presidency of the Foreign Commerce club of the port of New York comes as fitting tribute to a man not only long prominent in New York shipping circles, but, by virtue of his particular identification with the west coast trade of South America, well-known to shippers of both continents.

He has been affiliated with marine shipping for 39 years, beginning as a lad of 15, serving first for six years with one New York shipper and then for 31 years with the organization with which he is now associated as vice president, Wessel Duval & Co. Inc., 90 Broad street, New York city, an organization first conceived 109 years ago. With this background, he brings to his new position a valuable knowledge, combining years of practical experience with the best traditions of ocean shipping.

Mr. Baker was born in Brooklyn, and his first contact with shipping was with Lamnan & Kemp, New York, whose foreign shipments extended to the far corners of the world. Having thus acquired a student's knowledge of general shipping, he entered the employ of Wessel Duval & Co. Inc. as assistant freight manager of freighting and six years later was placed in charge of chartering tonnage and freight transportation.

In 1923, he became a partner and in this connection it is interesting to note that over the period of 53 years preceding, the company had taken 17 men from its staff into partnership relations, a record in which the firm rightfully takes much pride. When the company changed its partnership structure to that of a corporation in 1932, Mr. Baker became vice president. One of his associates, P. W. Alexander, became president, and others, B. E. Hood, S. W. Spring and E. Eastman, vice president. Guillerine Purcell, who had been associated with the company 45 years, became chairman of the board.

As an executive, Mr. Baker is active in the management of the company that was founded by Augustus Hemenway, a native of Maine, who first began his business career by trading between the ports of that state and the West Indies. The story of the company for a number of years thereafter is largely that of the achievements of Mr. Hemenway; the story of a young man, who

at the age of 20, extended his already flourishing business with the West Indies to include the River Plata—this in 1825, the year recognized as the first in the history of the present organization—and shortly after, the west coast of South America.

The extension of trading to the west coast hinged on the incident of a blockade at the port of Buenos Aires. Young Hemenway, sailing as supercargo on the *MERCURY*, with his merchandise of flour and provisions and upon finding himself unable to land at his intended port of destination, Buenos Aires, proceeded around the Horn to Valparaiso, where he sold his cargo to advantage and there loaded a cargo of copper ore for Boston.

Long since in the years that have elapsed the company has extended its west coast business to include not only Chile, but Peru, Ecuador and Colombia, with branches in these countries.

Incidentally, it is noteworthy that possibly the first attempt to maintain steam communication between the United States and the west coast of South America was marked by the operation of two steamers, *CITY OF VALPARAISO* and *CITY OF SANTIAGO*, of 1274 and 1296 tons net register, respectively, built especially for Mr. Hemenway, who foresaw that the change from sail to steam was inevitable, and which vessels were operated by the firm as his agents. These ships were built in 1875, but it was not until 1892 that the West Coast line of the company dispatched its first steamer—the *AFRICA*, of 1099 tons net register.

In addition to heading the Foreign Commerce club, Mr. Baker has numerous other affiliations. For several years he has been a manager of the New York Produce exchange and is now serving his third term as vice president of that organization. He is a director of the Maritime exchange; also a member of the board of visitors, of the New York State Merchant Marine academy, the Traffic club and the New York Board of Trade.

Mr. Baker is now hard at work on a vigorous program to carry out the principal objective of the Foreign Commerce club, which is to promote and preserve the commerce of the port of New York from the growing encroachment of ambitious ports in other parts of the country.

Cross Channel Ferries Have Novel Design Features

THE T. S. S. TWICKENHAM FERRY, first of three channel train ferries, building for the Southern Railway at the Neptune yard of Swan, Hunter & Wigham Richardson Ltd., on the Tyne, England, was launched on March 15. The two sister vessels which are to follow will be named HAMPTON FERRY and SHEPPERTON FERRY.

There are a number of interesting features in connection with these vessels. They are fitted with geared steam turbine twin screw drive built by the Turbinia Works of Messrs. Parsons. The boilers are of the Yarrow watertube type, and are being fitted for coal burning with special automatic Taylor stokers. Speed of the vessels in normal service will average 15 knots but it is expected that they will be able to do over $16\frac{1}{2}$ knots if required. The horsepower developed for each propeller will be 2500.

Elaborate Tank Experiments

One of the problems of design was to combine to the best advantage a bulky form above water with a fine form of hull below water. A fine form is especially necessary because the vessel's length (360 feet overall) is short for her speed and she is extremely broad (something over 60 feet) in relation to her draft (12 feet, 6 inches when ordinarily loaded). An elaborate series of trials with models was, therefore, made at the National Physical laboratory under the supervision of G. S. Baker. These experiments showed that it should be possible to obtain a speed of $16\frac{1}{2}$ knots with about 5000 horsepower delivered to twin screws, or 2500 horsepower for each propeller.

Special experiments were also made with model propellers, as these were particularly affected by the form of the ship and the shallow draft of water in which they must operate. Special model experiments were also made in connection with the steering gear and rudders which are provided at each end of the ship. Trials were also made on the effect of the rolling of the vessel by means of waves artificially created in the tank. A model was loaded for rolling purposes so as to create a similar motion to that encountered by the ships themselves when crossing the channel with a following sea.

The main service on which these ships will be engaged is to carry a train of 12 sleeping cars or, alterna-

tively, 40 loaded freight cars. For this purpose there are four lines of rails over the greater part of the train space. At the stern these converge into two tracks by which the trains will pass on to the shore across a drawbridge at the end of the dock. The depth of the vessel from keel to train deck is 20 feet and the height of the train deck space is 15 feet, 6 inches.

Load and Discharge Cars

The chief advantage of a ferry as opposed to a ship is in a ferry's ability to load and discharge vehicles without using cranes. As the waters of France and England, on either side of the channel, have a daily rise and fall between 10 and 20 feet, an inclined slip such as is used for the reception of many road vehicle ferries, was out of the question in this case owing to the necessity of having a gradient suitable for railway operation. The alternative of locks which would enable the vessels to link up with the shores on level terms at any state of the tide was therefore adopted and these docks are now being built at the ports of Dover and Dunkerque, thus determining the route of the ferries.

These vessels are to be fitted, in addition to their train carrying facilities, with a special garage, of all steel construction, entirely isolated on the after end of the upper deck, to accommodate 25 automobiles which can be driven on to the ship by an inclined ramp. The cars can thus be carried without any restriction as to emptying gasoline tanks, etc., while the owners can use the passenger deck accommodations. Should the traffic develop, it is also possible to carry heavy motor driven vehicles on the after part of the train deck space, the surface between the rails being made level for this purpose.

Care in Fire Protection

Particular attention has been given to fire protection. Passenger accommodations on the upper deck are of principally steel construction so arranged that separate sections can be isolated; while an elaborate provision of fire fighting appliance is fitted on the train deck.

The vessel is fully equipped with life-saving appliances sufficient for a total number on board of 550. Four boats are carried on each side of the ship on gravity davits, making the boats instantly available for use in

emergency. A special feature of these gravity davits is that the boats they will hold will be 6 feet above deck level, thus forming no obstruction.

It is expected with these vessels in service that a sleeping car express may leave the Victoria station, London, at midnight, delivering passengers at Paris the next morning in time for breakfast. While the primary object of these vessels is to carry trains of either freight or passengers, with the elimination of craning at both ports with consequent delay and greater risk of damage yet the new ships will have splendid promenade decks and saloon and cabin accommodations for passengers.

Naval Architects See Fleet

On June 14, some 300 members and guests of the Society of Naval Architects and Marine Engineers inspected the airplane carrier SARATOGA. The party, made up of American citizens only, boarded the SARATOGA at Pier 90, foot of West Fiftieth street, New York at 9:30 a.m. to visit parts of the ship not open to the general public.

Following the inspection, an illustrated lecture on airplane operations and airplane handling gear continued until about noon, when the party went aboard the Hudson River Day line steamer, CHAUNCEY M. DEPEW for lunch and a sail around the United States fleet, at anchor in the Hudson river.

Annual Lifeboat Race

According to an announcement made by Capt. S. W. Tansley, of the Cunard line, and chairman of the rules committee in charge of the race, the international lifeboat race will be held Labor day on the Hudson river near the George Washington bridge.

The United States lines has the honor of being the first steamship company to file an entry in the coming race.

Capt. John F. Milliken, of the United Licensed Officers association, reports that lifeboat crews from American, British, French, German Italian and Norwegian ships have already announced their intention of taking part in the race, and it is expected that many more ships will enter.

Seth H. Taylor Jr., of the Lincoln Electric Co., Cleveland, has been appointed Pacific coast manager, in charge of all the company's activities in that territory. Mr. Taylor has been in charge of the Los Angeles office for four years. Previous to that, he spent some time at the Cleveland headquarters of the Lincoln company, being engaged in research and applications of production welding.

Reviews of Late Books

The Use of Derrick Cranes, Safety Pamphlet No. 15; issued by the home office; printed and published by His Majesty's Stationery Office; paper; 27 pages; 9 3/4 x 6 inches; supplied by The British Library of Information, 270 Madison Ave., New York, or by MARINE REVIEW and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

This pamphlet is the result of an investigation of crane accidents over a number of years. Many accidents might have been prevented by the observance of reasonable precaution.

Among the more usual causes of crane accidents and crane failures have been improper use, careless handling, or failure on the part of users to carry out necessary maintenance work. Such comparatively common occurrences as fractures of parts, failure of ropes or chain or failure of anchoring appliances could be avoided in most cases by periodic thorough examination with replacement of defective parts and by proper use.

The pamphlet calls attention to the fact that such examinations and some of the other steps recommended are required by law at docks, shipbuilding yards, and buildings in the course of construction.

The interest of this pamphlet to the American shipowner and shipbuilder, and others not subject to the regulations of the British government, lies in the value of the suggestions made which will apply with equal force wherever such equipment is used.

Various features are discussed with reference to precautions that should be taken in the purchase of new and second hand cranes; in the erection of a crane; in tests after erection; in the question of stability, anchorage, overloading, etc. Many types of cranes and equipment are described and illustrated. Attention is given to such matters as corrosion of metal parts, faulty lubrication, ropes, rope attachments, drums, pulleys, etc.; brakes and controls and also to the operating mechanism.

Industrial-Radiography, by Ancel St. John and Herbert R. Isenburger; 232 pages; 9 x 6 inches; with numerous illustrations; published by John Wiley & Sons Inc., New York; supplied by MARINE REVIEW for \$3.50, plus 15 cents postage; and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

This book, prepared by authorities on the subject, presents the practical aspects of industrial radiography in the form and language which can be understood by those who desire a thor-

ough understanding of the basic theories involved.

It deals in an authoritative manner with the practical applications of X-ray and radium inspection. No attempt has been made to produce a scientific treatise or a comprehensive work of all the theories. The theoretical part has been treated briefly, yet thoroughly enough to cover all that is needed for a study of the art and for successful operation.

In preparing this book, the authors have had in mind its practical usefulness for engineers, metallurgists, salesmen, and executives who have to do with developing, working, purchasing and selling materials. It will also be helpful to instructors, students and operators.

Engineers and others will have their attention directed to the value of this comparatively new technique in activities where hitherto its use has not been fully realized.

There are 20 chapters, the headings of some of them will indicate the field covered. The infancy of radiography is dealt with in chapter 2. Other subjects covered are the present status of industrial radiography; nature and properties of x-rays; production of x-rays; detecting and recording x-rays; an installation for industrial radiography; photographic procedure; interpreting radiographs; radiography of welded vessels and structures; some interesting examples; and operating and cost data.

Many illustrations are given which aid greatly in interpreting and clarifying the text matter. There are three appendices of tables, charts, and bibliography on radiography.

With the steadily increasing demand for certainty as to the quality of workmanship and material in shipbuilding and ship repairing, this book will be found of special value in all shipyards and ship repair plants. It is in every sense of the word a practical treatise and gives a great deal of information developed during long experience in this work.

Procedure Handbook of Arc Welding Design and Practice; a revised and enlarged edition, published by The Lincoln Electric Co., Cleveland; over 450 pages; 9 x 5 3/4 inches; several hundred illustrations; supplied by MARINE REVIEW for \$1.50 plus 15 cents postage; and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

Because of the demand, which exhausted the original issue published last year, this book has been reissued.

The eight principal sections deal with various phases of arc welding in

a simple, concise manner, well illustrated with detailed drawings and photographs. Practically every use and application of arc welding is described.

Among the many additional features in the new edition are the following: weld inspection (visual, stethoscopic, electro-magnetic, x-ray and gamma ray); study of stress distribution by means of polarized light; a simplified method for the design of arc welding machinery; procedure and speed for arc welding aluminum; technique and speeds for welding copper; and construction of welded water lines. A portion of this book is devoted specifically to the use of arc welding in shipbuilding and ship repairing.

VDI Forschungsheft 363, Langen-Lindner, paper, 22 pages, 11 3/4 x 8 1/4 inches, published by VDI-Verlag G.m.b.H., Berlin, Germany, and supplied by MARINE REVIEW, Cleveland, and in London, by the Penton Publishing Co. Ltd., 416-17 Caxton House, Westminster.

This bulletin which is in German and published by the Verein deutscher Ingenieure as a supplement to *Research in the Field of Engineering Technique* contains two articles relating to research on diesel engines. The first by Dr. Arnold Langen is entitled "The Diesel Locomotive with Direct Drive," and the second by Dr. W. Lindner is entitled "Researches on the Scavenging Process in Two-cycle Machines." The first article describes investigations undertaken by Dr. Langen which eventually led to the construction of a direct drive diesel locomotive.

The second article on "Researches on Scavenging in Two-cycle Machines" is divided into three parts. The first part describes investigations with a cylinder model and discusses research arrangements; stream flow with ordinary and high scavenging, and discharge point; and influence of the shape of the inlet canal or opening. Part B describes researches on a model cylinder including measurements with a stationary piston and a moving piston, giving data on stream flow and discharge point, effective orifice cross section (nozzle value), effective time-area and flow figure, and relation of the discharge point. That section also discusses measurement on an ignition machine with information on the influence of the back pressure exhaust in the inlet opening upon the flow figure, and scavenging efficiency and its connection with the operation of the machine. The third section describes measurement of the scavenging efficiency.

The Acheson Colloids Corp., formerly the Acheson Oildag Co., Port Huron, Mich has made available for distribution its technical bulletin No. M92, dealing with colloidal graphited lubricants.

Marine Boilers

(Continued from Page 12)

produces casing elements that are remarkably true to the required dimensions and having flanges amply rigid so that with brass-sheathed asbestos packing between them they will hold their shape when bolted together. Thus the entire assembly is substantial and airtight even under the highest air pressures to which such casings are subjected or roughly 12 inches water gage.

A casing made up of sections fabricated as described is used principally with express-type boilers but is described in this detail because it represents the most complex form of construction used. A much simpler type of casing, consisting of flat plates bolted to angles, is used with most of the cross-drum boilers.

Some idea of the scientific methods used in modern boiler-making is given in the foregoing, but it is in the laboratory of this plant that receive the physical evidence of scientific activities, a striking example of the remarkable progress that has been made in boiler manufacturing during the past few decades. This change is in the completeness of the equipment for the physical test of materials, for chemical analysis of materials, analysis of feed and boiler water, and for exhaustive metallurgical research work. Such equipment is, of course, necessary in modern boiler-making, which embraces so much research work and where codes, such as the proposed new rules, require physical tests of materials and the various tests proposed for welded boiler drums.

The chemical laboratory plays an important part in modern boiler-making, because of the required chemical analyses of materials, the necessity for checking the composition of alloy castings; and the necessity for the analysis of boiler feed-water, required, particularly, for land boilers that are operated at such high ratings as to give great importance to the quality of the water fed to the boilers. It is quite natural, also, that many metallurgical problems must be solved in modern boiler making that has, in the past, involved studies of such matters as caustic embrittlement, the effects of repeated stresses, the corrosive action of the gases of combustion on boiler tubes, and the causes and effects of corrosion fatigue.

To return to the question raised in part one of this article, appearing in the June issue—will the proposed rules seriously affect the procedure followed in the fabrication of marine boilers or increase their cost? It must be apparent to a visitor to a plant such as the one described that,

although the proposed rules are markedly more comprehensive than those now in force, the present rules merely reflect good practice in boiler-making. In other words, the proposed rules should in no way affect either the manufacturing procedure or the cost of marine boilers.

American Grain Shipments

(Continued from Page 33)

bushels in the 1933 period, although wheat shipments increased from 473,000 bushels to 1,364,000. Corn, however, declined from 9,698,000 bushels to 4,906,000, with oats down from 1,979,000 bushels to 676,000. No rye or barley moved from Chicago during the five months, but a small cargo of rye was shipped over the Illinois waterway and Mississippi river to New Orleans, the first time there has been such a movement.

Lake shipments from Milwaukee to June 15 amounted to 1,478,177 bushels, divided fairly evenly among wheat, corn and oats. Receipts during the period were 167,525 bushels of wheat and rye.

Canadian Grain Shipments

Shipments of grain from Fort William and Port Arthur, Ont., have continued to move in considerable quantities since the report published in the June issue of MARINE REVIEW. The quantities of wheat moved by lake vessels from Fort William and Port Arthur, Ont., from May 15 up to June 15, are as follows: to Canadian lower lake ports, 13,130,911 bushels; to Montreal, 2,895,682 bushels; to other Canadian ports, 289,259 bushels; to Buffalo, 6,911,720 bushels; and to other United States ports, 1,627,409 bushels.

During the same period oats moved from Fort William and Port Arthur in quantities as follows: to Canadian lower lake ports, 2,024,081 bushels; and to Montreal, 188,920 bushels. No oats were shipped to any other ports. Barley shipped during this period amounted to 649,762 bushels to Canadian lower lake ports; and 145,823 bushels to Montreal. A total of 62,540 bushels of rye were shipped during this period to Canadian lower lake ports. Mixed feed, oats, croats, to the amount of 530 tons, were shipped to Canadian lake ports. Screenings were shipped as follows during this period: to Canadian lower lake ports, 1358 tons; to Buffalo, 950 tons; and to other United States ports, 3132 tons.

The Edward Valve & Mfg. Co. Inc., East Chicago, Ind., has issued a bulletin discussing the desirable characteristics of boiler non-return valves, including photographs of a number of installations.

Wolverine

(Continued from Page 15)

constant supervision of the Presque Isle State Park commission whose police watch over the ship and see that she is protected from vandals.

Time Taking Its Toll

However, even police cannot stop time from working its damage, and as a result dry-rot has attacked decks and cabins, and the WOLVERINE now rests in a few feet of water, bravely appearing still to be riding the waves. Her broken connecting rod still hangs where it fell on that last eventful cruise. Her galley ranges, ice boxes and stores rooms are thick with dust, the white tile floor in the once spotless galley is still trying to show through its covering of shore dirt, and her ports no longer house her once bristling guns.

So for the present ends the career of the WOLVERINE, the lake's and navy's first iron ship, and the only United States navy ship to ever carry arms on the Great Lakes, truly a monument to pace and goodwill on this frontier of two great neighboring nations.

It is hoped by all lovers of things marine, that some how a way will be found to preserve this old and valuable relic of bygone days, and that quite possibly her future days could be turned to some less strenuous but useful occupation.

Feed Water Treatment

(Continued from Page 18)

into the boiler or as close to it as possible. The experience is not unusual to have the coils or tubes of the heater close up gradually, which, of course, reduces the temperature of the feed water going into the boiler. This is due to precipitation of the temporary hardness and occasionally by the permanent hardness caused by feeding the treatment in too soon. The deposition of the mud, therefore, occurred in the heater or the feed line rather than in the boiler.

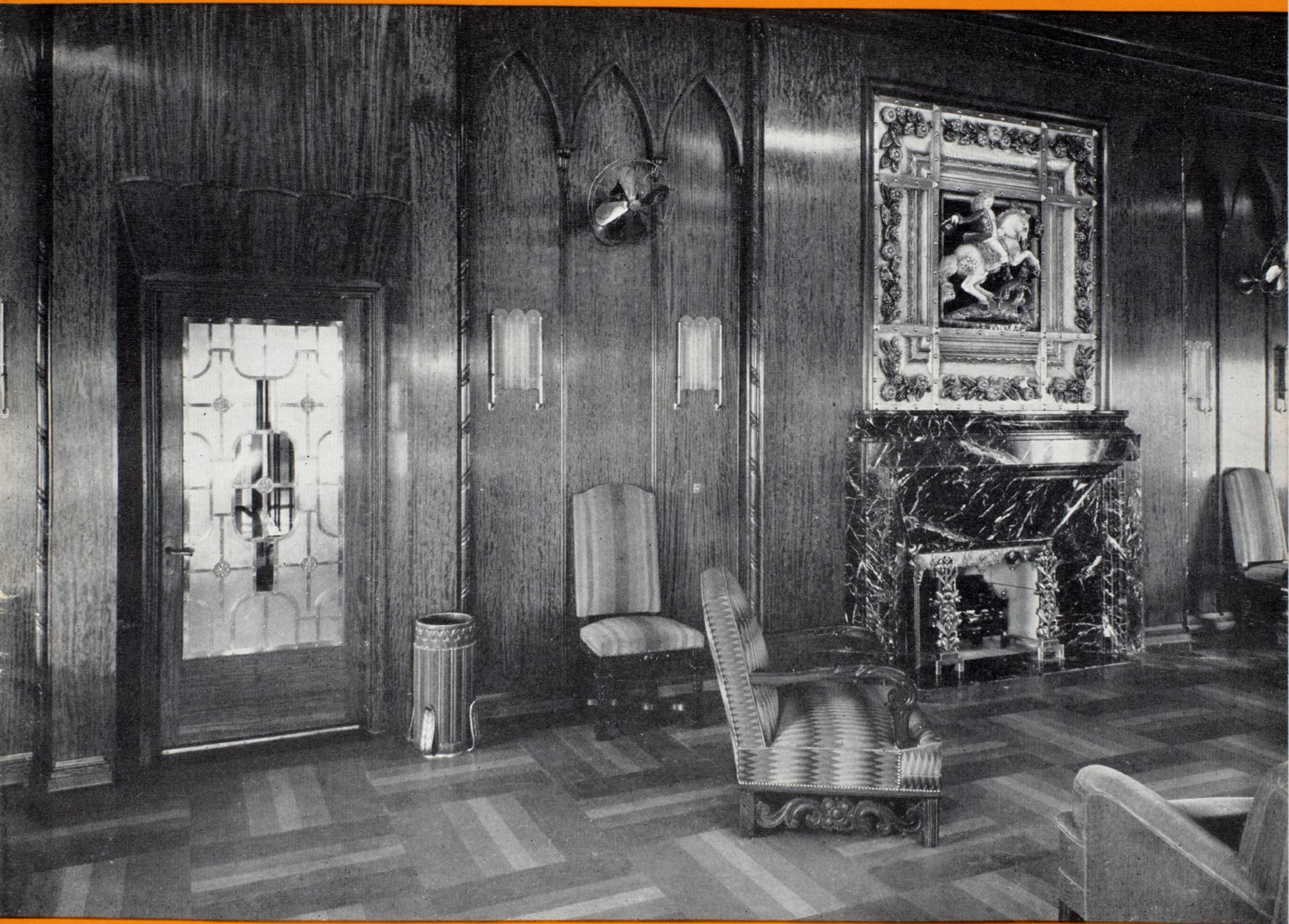
The chemical balance which should be carried by each individual boat varies so much that it is impossible to give a definite rule for all boats to follow. This problem can be solved by making use of the services of men trained in this field, who can make accurate recommendations after a survey of the conditions.

The S. S. SHAWNEE, of the Clyde-Mallory line, which docked at Pier 34, Hudson river on June 2, established a new speed record for the northbound run from Jacksonville of 40 hours and 41 minutes. She maintained an average speed of 20.14 knots on the run to New York.

Marine Review

Reg.
U. S.
Pat.
Off.

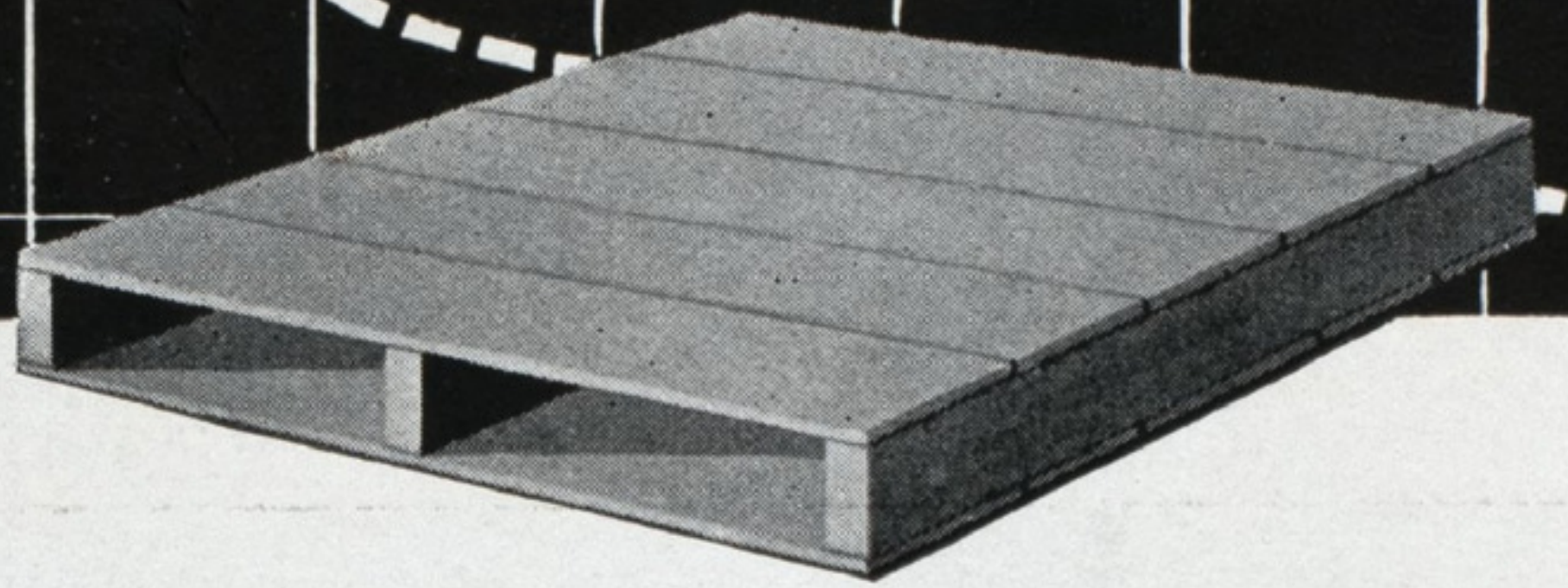
*The National Publication Covering the Business of
Transportation by Water*



Smoking Room—S. S. President Hoover

July, 1934

TO *Shrink* MATERIALS HANDLING COSTS STILL MORE



*... place product on
pallets and stack unit loads with*

ELWELL-PARKER FORK TRUCKS

Assembling marine merchandise into unit loads on pallets, and swiftly moving these units by Elwell-Parker Fork Trucks, creates new, large savings both in time and in cash.



1. Place boxes, bags, barrels or bales of goods on pallets; stack or group into unit loads of maximum size for storage in warehouse or on dock.
2. If outgoing, deliver to ship's side for loading and water transport on original pallets.
3. At destination, reverse process and bring out unit loads on pallets; pick up at ship's side with Elwell-Parker Fork Trucks and deliver to warehouse or freight cars.
4. Make speed along docks; pass through low doorways; stack in warehouse (clear to roof) in straight, even tiers; take down again, as from a shelf, with equal speed and safety.

Downward travel of load (on Elwell-Parkers only) generates current returned to battery.

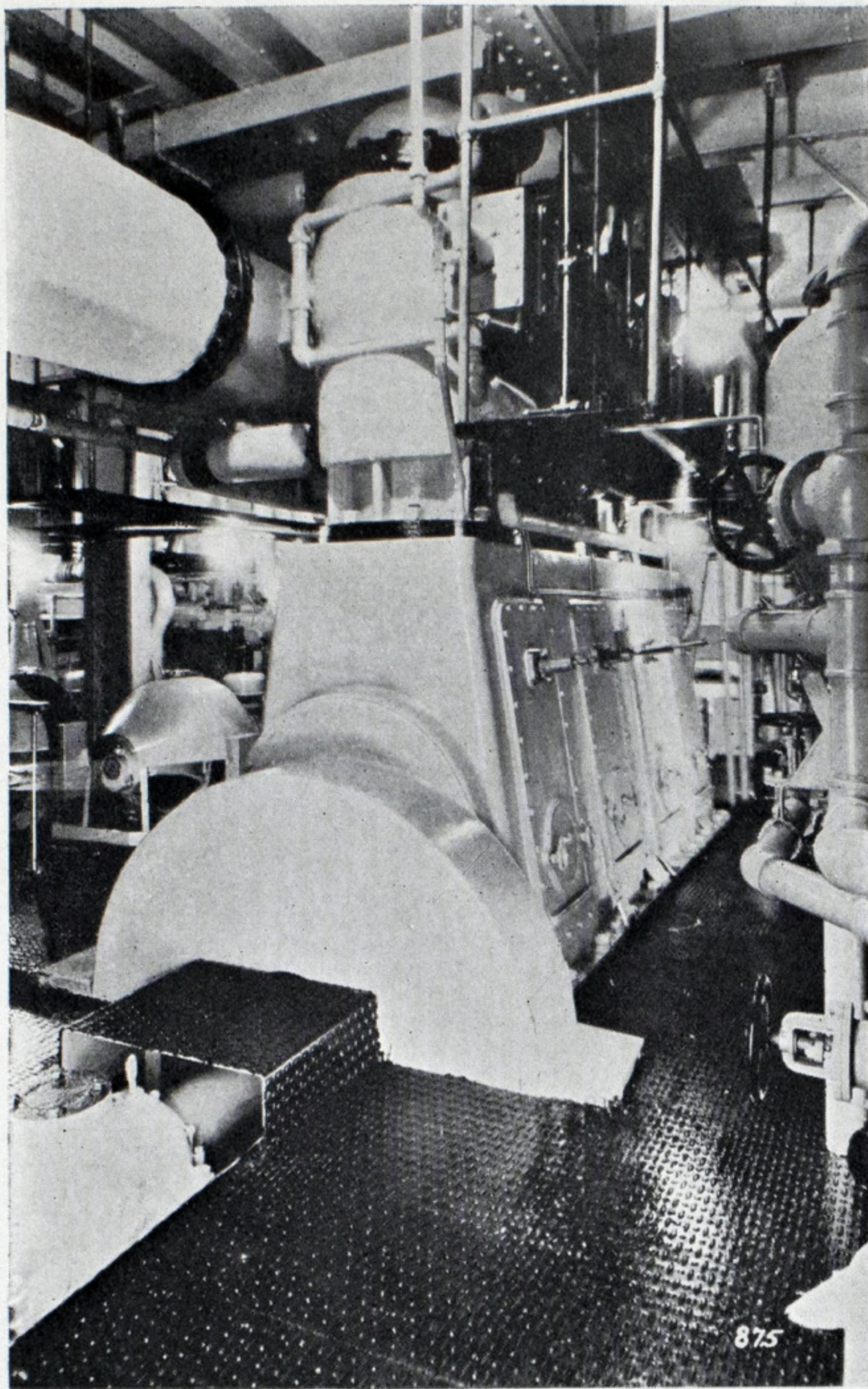
Docked ships earn no dividends. Speedy, dependable Elwell-Parker Fork Trucks, handling unit loads on inexpensive pallets, cut loading time, speed schedules, *make money for owners.*

Elwell-Parker was first to design Trucks to carry big load units and tier them safely; latest to improve with exclusive performance features. Engineers with special marine cargo-handling experience are available for consultation without obligating you. The Elwell-Parker Electric Company, 4213 St. Clair Ave., Cleveland, Ohio.

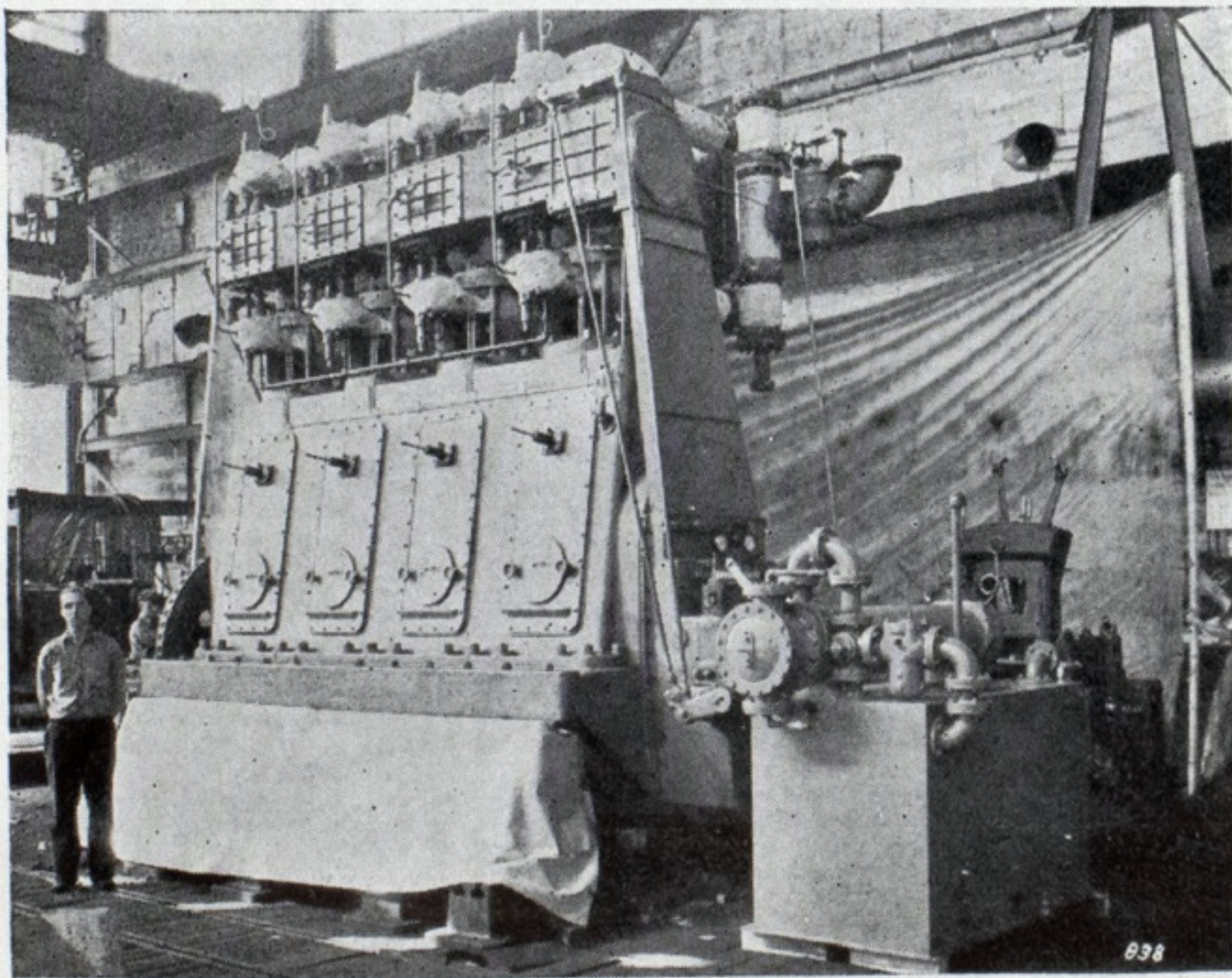
New **ELWELL-PARKER** *Fork trucks*

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The Steam Engine Again Challenges



Starboard engine on Pennsylvania Railroad Company's new S. S. "Del-Mar-Va"



Marine Unaflo with oil cooler and tank

THE development of the steam engine has proceeded in cycles occasioned by competition and the continuous demand for higher economy. Starting with James Watt, we find a progressive improvement in the successive types with a resulting abandonment of the older and less economical.

Following Watt came the higher speed throttling engine; then the single-valve automatic, allowing full boiler pressure in the cylinder; then the Corliss; and then the compounding of single-valve as well as Corliss engines. At this stage, the gas engine, the Diesel engine, the steam turbine and purchased electricity began making great inroads into the manufacturing of stationary steam engines; and to the rescue came the poppet-valve unaflo engine, which has been developed to such a degree of high economy that this engine, as built by the Skinner Engine Company, is being sold for replacing other types of prime movers, on a self-liquidating basis.

This company is the recognized leader in the unaflo engine industry, having built approximately 50% of all stationary unaflo engines and all of the large-capacity marine unaflo engines produced in this country.

With the higher steam pressures and temperatures that can now be safely obtained, we prophesy that marine unaflo engines will, in the near future, be offered with a steam rate of from 7.5 pounds at slow speed to 8 pounds at full speed per i.hp-hour.

The steam engine is a by-word for ruggedness, durability, dependability and simplicity; and if the economies prophesied above can be obtained without the loss of any one of these four qualities—and we are sure they will be retained—it will be the poppet-valve unaflo steam engine that will henceforth set the pace in marine propulsion.

(Skinner Unaflo engines are built in the largest shops in this country devoted exclusively to the building of steam engines.)

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Branch Offices in All Principal Cities



A Wolf at the Door

THE fight against the very existence of an American Merchant Marine, which seemed to have been concluded with the passage of the Shipping Act of 1928, has been renewed with greater intensity than ever. American shipping now has to combat all the ingenuity and diplomatic skill that its foreign rivals can muster as well as political assaults at home. Supported by various elements within our own country, alien forces have boldly challenged our Government's policy and are spreading misinformation through cleverly designed, anti-American propaganda.

The best way to fight this enemy at the door is to see to it that all Americans understand that the existence of an adequate fleet of American ships will develop our foreign markets; check excessive ocean freight rates; protect against interruptions in service; retain for America a fair share of the revenue derived from her vast overseas trade; benefit industry and business throughout the land; increase employment of American workers both ashore and afloat; contribute to this country's international prestige and serve in the national defense.

When these facts become common knowledge the wolf will get short shrift.

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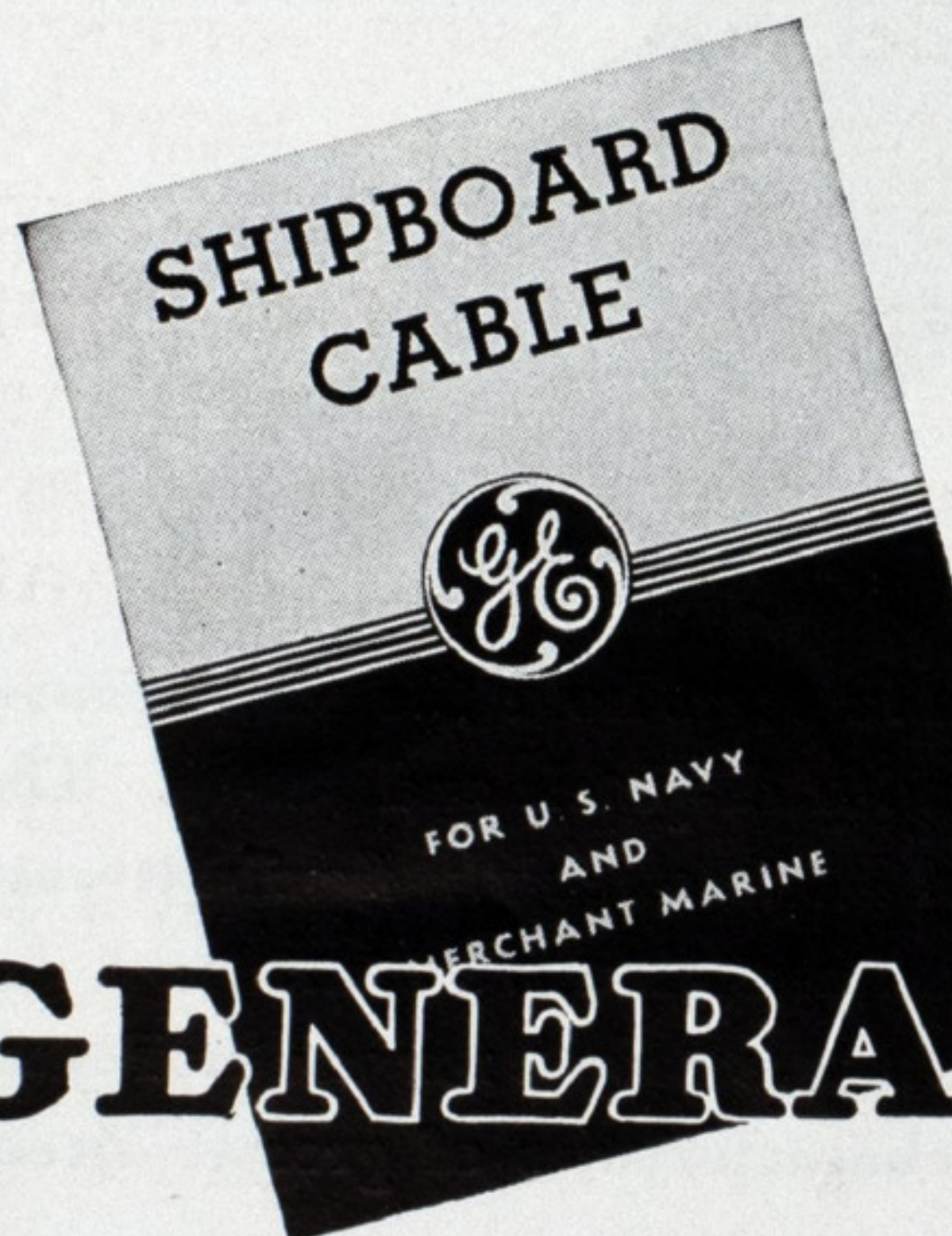
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TO USERS OF SHIPBOARD CABLE

HAVE you ever needed a publication which would enable you to determine easily the answers to the following questions regarding shipboard cable: What types of insulation are available, what sizes of conductor? What are the outside diameters, the thickness of insulation, the weights of these cables? Is there a standard size of cable which will better suit your needs than the type you are using?

New 12-page Book

Answers to such questions as these will be found in a new 12-page General Electric publication, *Shipboard Cable*. This book was prepared for the express purpose of assisting the user of shipboard cable to order cable which will best meet his needs. It covers all cable which is designed especially for shipboard use, but does not list other industrial cable. Every shipyard and drydock should have a copy of it on file; every port engineer, chief engineer, and chief electrician should have one for reference.



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In the event that this publication does not give you all the information you require, we offer the assistance of our cable engineers and specialists, men who have had wide experience in the application and installation of all types of insulated cable. To obtain their services, simply address a request to the nearest G-E sales office.

All Types and Sizes

The General Electric Company is prepared to furnish insulated cable of every type, size, and voltage for every application, together with the necessary accessories for installation. Available for shipboard use are not only the standard basket-weave armored cable, but also portable cable of two, three, or four conductors; arc-welding cable; and ship-to-shore cable for power connections in drydock.

For Copy of Book

For your copy of this new publication, *Shipboard Cable*, mail the attached coupon, or write or call the nearest G-E sales office. If you desire more than one copy, make your request on the coupon.

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The better grades of Manila fiber, selected for use in Plymouth Ship Brand Manila Rope, possess the characteristics of greater strength, finer texture, and added flexibility.

It can therefore be depended upon to serve with safety and with greater economy than ropes of lesser quality.

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Manila Hawsers Towlines
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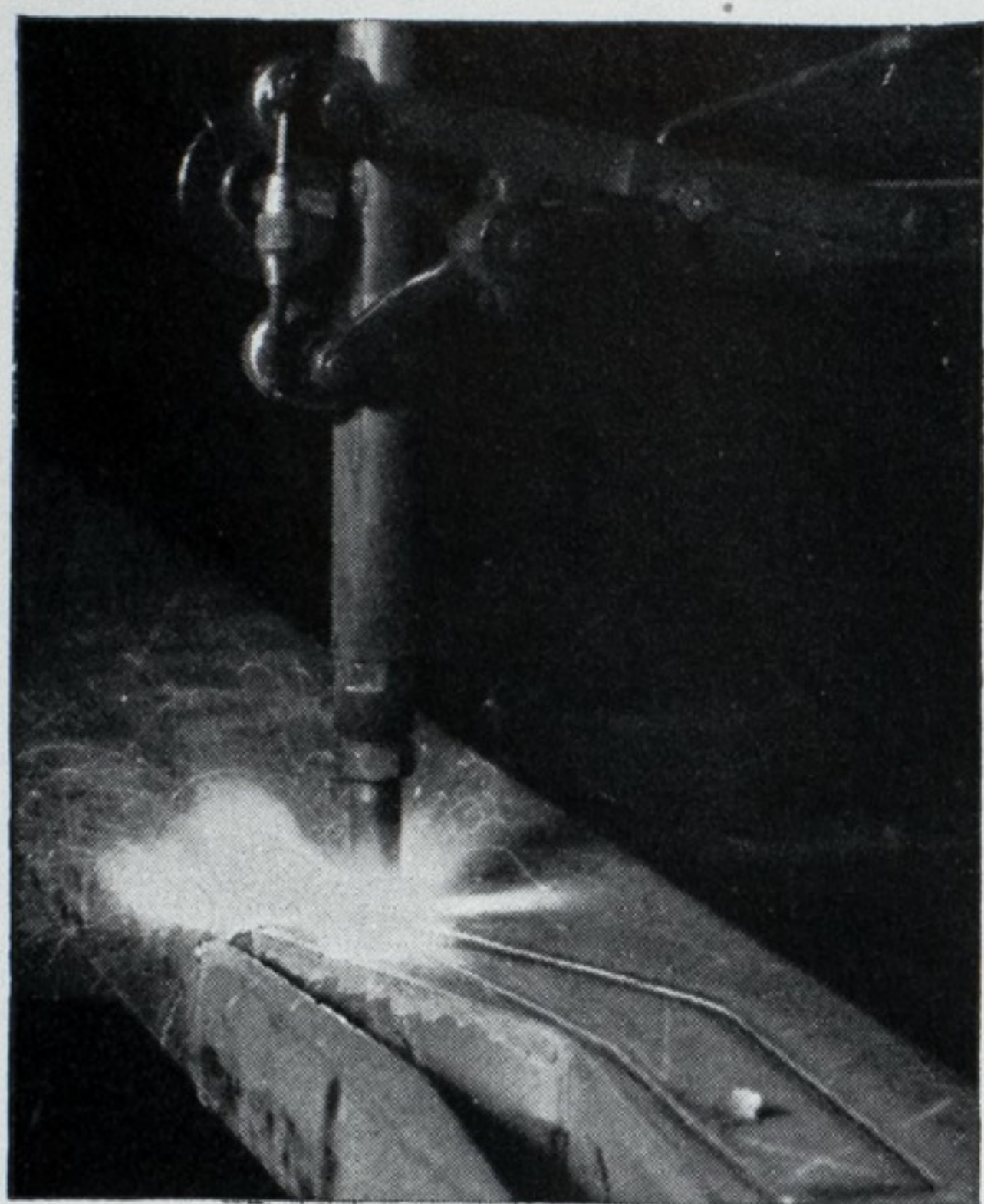
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"WE ORDER EVERYTHING FOR OXWELDING AND CUTTING FROM LINDE"

Linde Process Service



• Pinion gears, connecting links, reach blocks, pull levers and dipper teeth are shape-cut from strong alloy steels in routine operations. These dipper teeth are being accurately formed from alloy steel stock.

WIDENS USEFULNESS OF OXY-ACETYLENE MACHINE CUTTING

RECENTLY a power shovel manufacturer reported how Linde Process Service helped perfect a series of complicated flame-cutting operations:

"We started to use oxy-acetylene shape-cutting several years ago—at first, only for dipper teeth. Later we used it on many other parts for which the strength of rolled or forged steel was desirable.

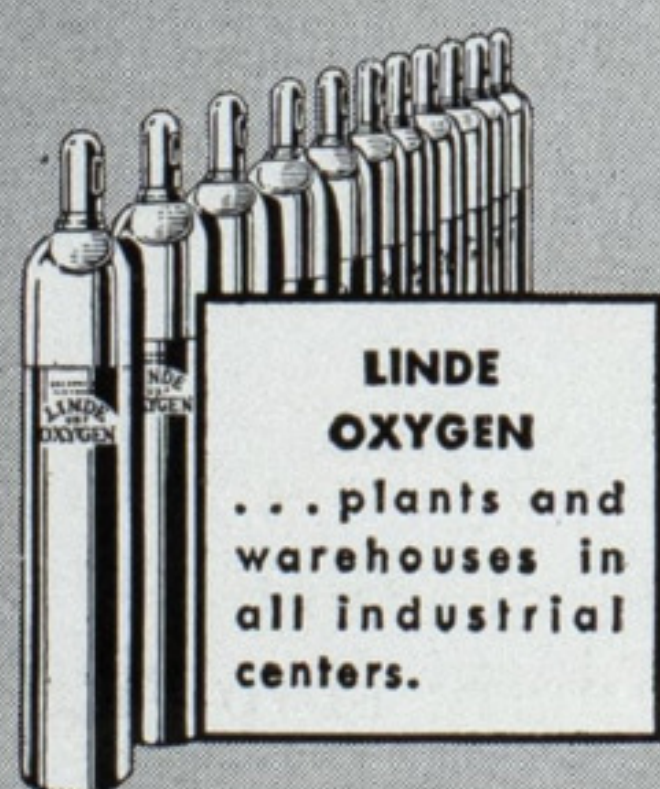
"On these parts oxy-acetylene cutting proved so profitable that

we asked Linde to help us develop accurate shape-cutting of our heaviest parts from slabs and ingots.

"Linde Service Operators assisted in organizing this heavy cutting and advised on preheating procedures for special strong alloy steels. They supplied data on most efficient oxygen pressures, nozzle sizes, and cutting speeds.

"Now, we have replaced nine machines with two shape-cutting machines. We are cutting heavy steel to tolerances of 1/32-in. and less. We shape-cut parts accurately from steel 20 in. thick. Angle corners and curved cuts are simple for us."

By translating proved methods into terms of actual plant requirements Linde Process Service helped organize these shape-cutting operations for greatest speed, economy and dependability. It can probably help you in similar work. Ask the nearest Linde Sales Office to show you how.



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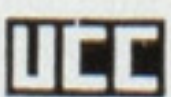


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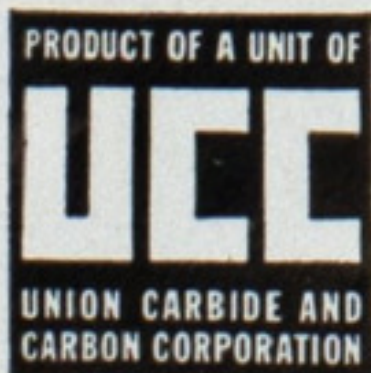
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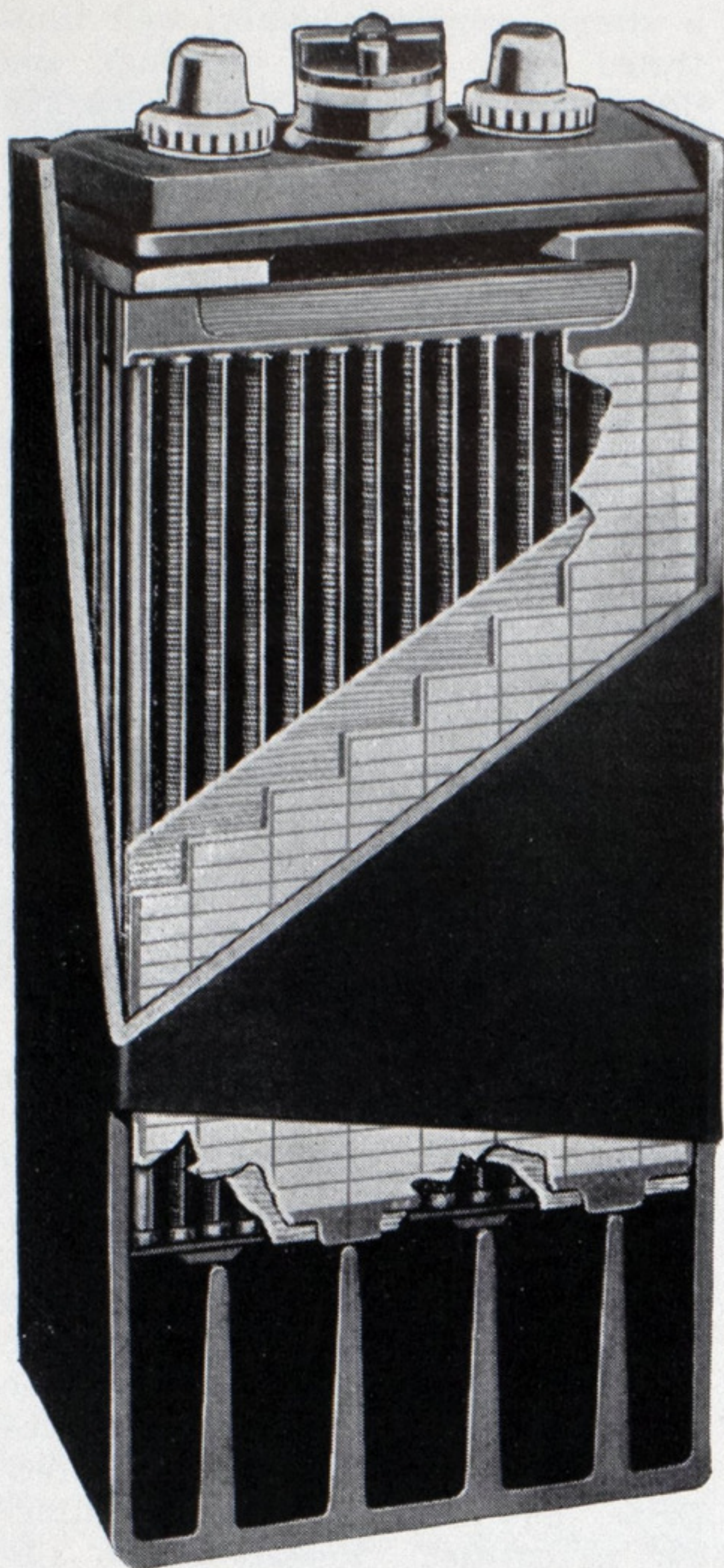


Users of products and processes developed by Units of Union Carbide and Carbon Corporation benefit from a most unique coordination of scientific research with manufacturing, sales and service facilities. You are cordially invited to visit this summer the numerous exhibits sponsored by the Corporation in both the Basic and Applied Science sections in the Hall of Science at Chicago's 1934 A Century of Progress Exposition.

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Down at the bottom of every Exide advertisement is a little phrase which is more significant, perhaps, than any other single fact about batteries. "The World's Largest Manufacturers of Storage Batteries for Every Purpose." What this means to you as a battery buyer or user is that an unparalleled wealth of experience goes into the making of every Exide.

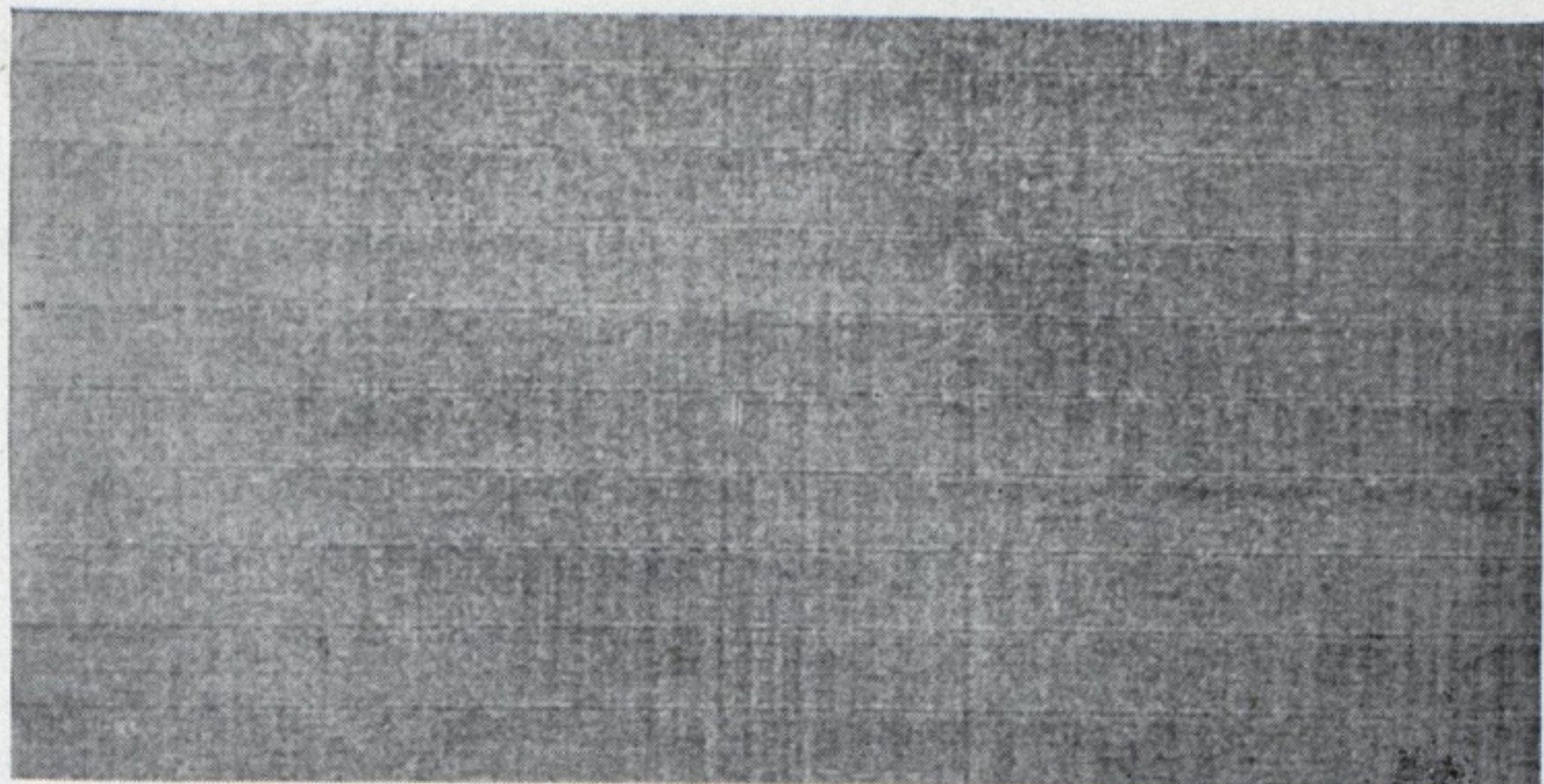
This experience has been gathered over a period of nearly half a century—not from any one source exclusively, but from every storage battery application in the world. For Exides are used in every branch of industry, and in every modern mode of transportation, ashore, afloat, and in the air as well.

When you buy an Exide Battery, you are assured of the dependability, sustained power, low maintenance costs and long life which this broad experience alone makes possible. You are assured of an engineering service organization behind the battery which enables you to get out of an Exide all the outstanding value built into it. You are certain also, of a battery engineered for its specific application—perfectly adapted to its job.

THE ELECTRIC STORAGE BATTERY CO., Phila.
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto



BETTER CASTINGS with **Mayari** PIC IRON★



A CERTAIN CASTING had a top section, about 4 in. thick, which had to be machined. When an ordinary iron mixture was used a porous surface resulted, as shown at the left. The addition of a small percentage of Mayari to the cupola mixture eliminated this condition, and a casting was obtained with a smooth, dense surface, as shown at the right.

This is a case where Mayari was used for its all-round improving effect. Castings made with Mayari machine easily to a smooth, highly wear-resisting surface even on a thick section; they have a fine, close

grain, and are free from blow-holes, spongy spots and other imperfections.

There's another highly important use for Mayari. It is a natural nickel-chromium alloy pig iron and offers a simple, economical method of making alloy-iron heat-resisting castings.

In most cases it takes only a small

percentage of Mayari to impart the desired properties. Engine and pump cylinders, piston rings and similar castings can be made sounder and longer wearing, grate bars and other furnace parts can be made to stand the heat better, at very moderate cost, by using Mayari Pig Iron in the mixture.



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District Offices: New York, Boston, Philadelphia, York, Wilkes-Barre, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Indianapolis, Detroit, Chicago, St. Paul, Milwaukee, St. Louis, Houston, Dallas. *Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

“Who’s Who” on the Great Lakes

The Great Lakes Red Book is a vest pocket directory of the Great Lakes Vessel Trade

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It contains a list of all the vessels plying the Great Lakes and tells the names of the owners, the captains and the engineers. Contains a separate list of the ore carriers showing the capacity of each.

It's the only vest pocket directory of

the vessel trade of the Great Lakes and is a valuable handy reference book both for the salesman calling on his trade and the captain, engineer or sailor who wants to keep in touch with his former sailing mates.

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Publishers of MARINE REVIEW

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Cleveland, Ohio

209-M

—in 1930



Better let me fix that tooth for you.



All right—but not just now. I'm too busy.

—in 1931



Better let me fix that tooth for you.



I'd like to—but I can't afford it this year.

—in 1932



Better let me fix that tooth for you.



I wish I could—but I haven't got any money.

—in 1933



Better let me fix that tooth for you.



I'm going to do that—just as soon as I get out of the red.

—in 1934



There now. It's all over. I told you it wouldn't hurt. Hate to see a man lose his teeth.

MORAL: You can't put it off forever.

THE PUSEY AND JONES CORPORATION

Wilmington, Delaware

Shipbuilders Since 1848

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The marine industry is of tremendous importance as a market for your products and service.

Marine Review can assist you in securing better sales returns. It is subscribed for by more steamship executives and ship operating officers than any other marine publication. Further, Marine Review gives you complete coverage of the shipyards as virtually every one of them subscribe for one or more copies.

Be sure to include Marine Review in your sales and advertising plans to reach the really important men who say yes, and O. K. requisitions in the marine trade.

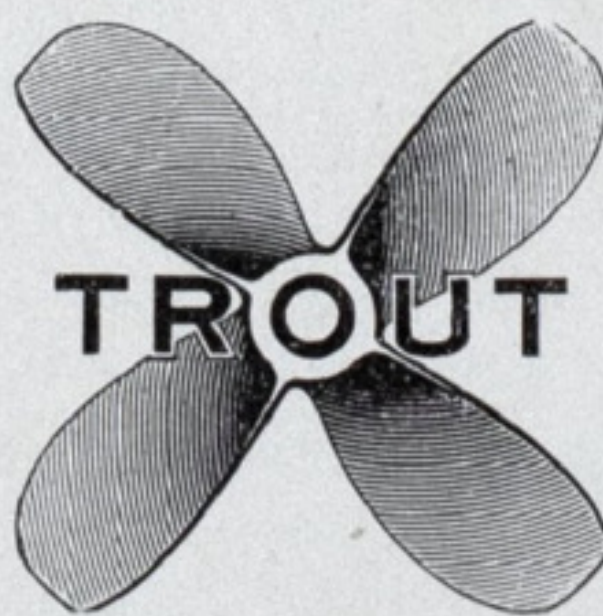
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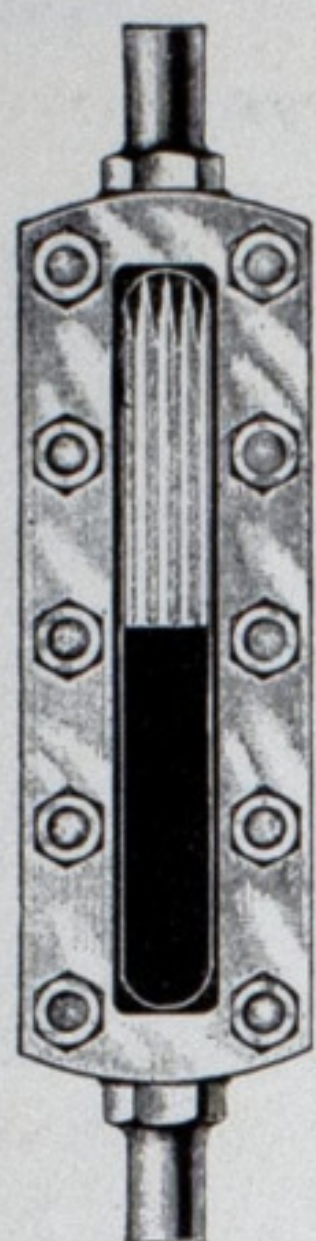
'Phone Washington 5361

Classified Advertisements

FOR SALE

Sand & Freight Steamer, length 133 ft., breadth 26 ft. 6 in.; draft loaded 8 ft.; self-unloading conveyor equipment. Ideal for sand, gravel, coal, stone, etc. Valley Sand Co., Bay City, Mich.

SEALED PROPOSALS will be opened by the Supt. of Lighthouses, 3760 East Jefferson Ave., Detroit, Mich., 2 p. m., August 1, 1934, for the purchase from the United States of the Lighthouse Tender Elm. Information upon application.



REFLEX WATER GAGES

Used on all types of boilers by all the Principal Navies of the world

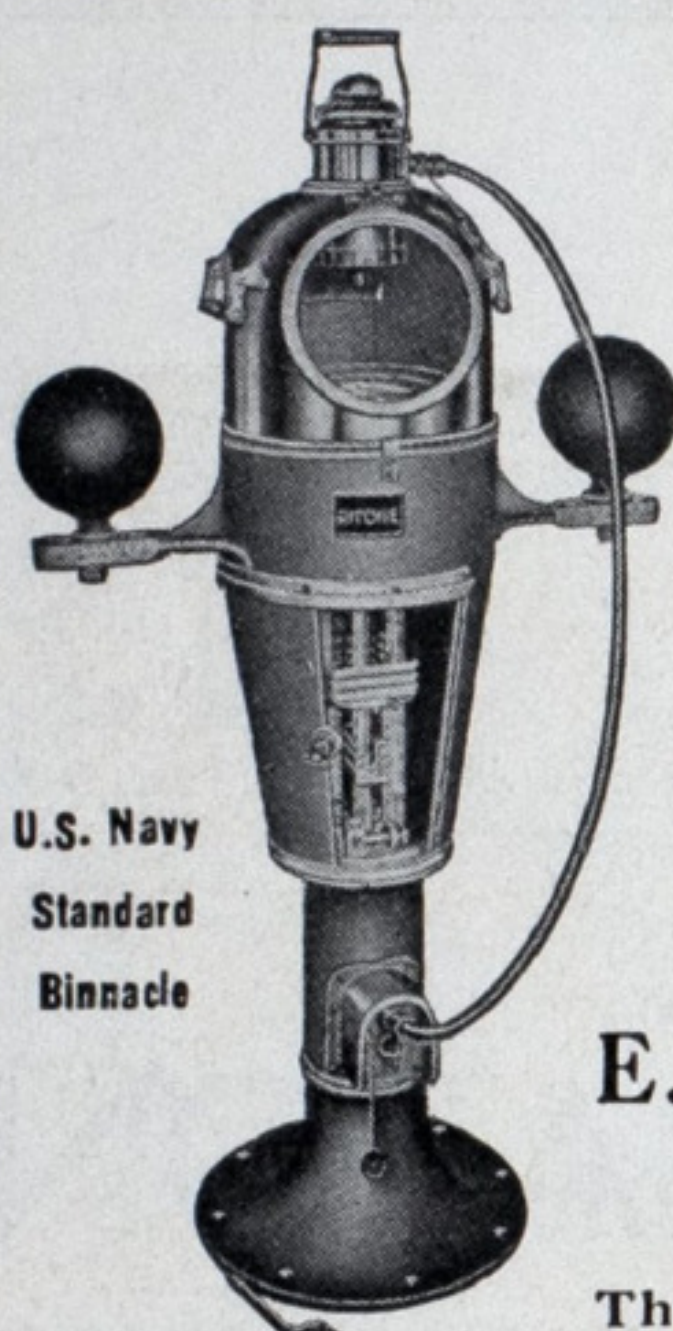
"The Water Shows Black"

ADVANTAGES: Quick and reliable observation of the water level. Safe, sure and durable at high pressure. Not affected by cold air drafts. Most effective protection against injuries to boilers and workmen. Easily applied to all types of gage glass fittings.

When filled with WATER the Reflex Gage always appears **BLACK**. When empty it instantly shows **WHITE**. No mistake possible. This feature alone is worth many times the cost of the Reflex.

Send for catalog of Water Gage Apparatus

MANUFACTURED BY THE
**JERGUSON
GAGE & VALVE CO.**
WINTER HILL, SOMERVILLE, MASS.



THE RITCHIE LIQUID COMPASS

The Standard Liquid Compass the world over.

Used Exclusively in U. S. Navy for over 40 years.

Over 65,000 on Merchant Vessels in all parts of the world.

Made in all sizes 2 to 12" dia.

Magnets for adjusting Purposes.

E. S. RITCHIE & SONS
Brookline, Mass., U. S. A.

Agents for the Great Lakes,
The Upson-Walton Company, Cleveland, Ohio

Bids Wanted

FERRY BOATS FOR GALVESTON-BOLIVER CHANNEL SERVICE
—Sealed bids in duplicate will be received until 11 a. m., July 16th, 1934, for two Ferry Boats. Bidder may bid on one or both. The boats may be of new construction or of previous service. They are to be used in conjunction with U-shaped landing slips adapted to approximate lengths of 100 ft. to 140 ft. and beam width up to 50 ft. Capacity of each boat shall be 20 to 30 standard automobiles. Draft loaded 6-1/2 to 7 ft. Economical working speed shall be 10 miles per hour. Power shall be some standard type of oil combustion engine and the boats shall be propeller drive front and rear (fore and aft), also ruddered fore and aft. They shall be so decked and arranged that vehicles will be protected from sea spray and may be loaded and unloaded at each end. The boats must be seaworthy and stable, capable of operating in the open waters in the Gulf of Mexico. They are to be furnished complete in every detail, ready to operate and complying with all maritime regulations for the waters at Galveston, Texas.

Bidders on used boats shall state the date of construction and name of shipyard where built; class and type of service in which the boats were engaged. Give size, length, beam, capacity, kind of hull, wood, steel, etc., and such other details as may be deemed fit. Detailed specifications are desirable.

Bidder shall state total price and date he expects to deliver the boats. Such date shall be preferably within thirty days after acceptance of bid. The Commissioners Court of Galveston County, Texas, reserves the right to reject any and all bids and waives any informality in those received. Address bids to the undersigned and mark them "Ferry Boats."

I. PREDECKI,

County Auditor.

Galveston, Texas, June 13th, 1934.



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now offer an unexcelled Freight and Passenger Service to Europe via Bremen or Hamburg.



Fast Freight Services To Bremen and Hamburg, also via Antwerp from outports . . . including all shipping lanes from Montreal to Puerto Mexico and from all North Pacific ports. Special low rates in transshipments.

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Pleasure Cruises Around the World, to the West Indies, to the Northern Wonderlands and Russia, the Mediterranean, Around Africa.

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NORTH GERMAN LLOYD**

57 Broadway, New York, N. Y. — or Local Agents

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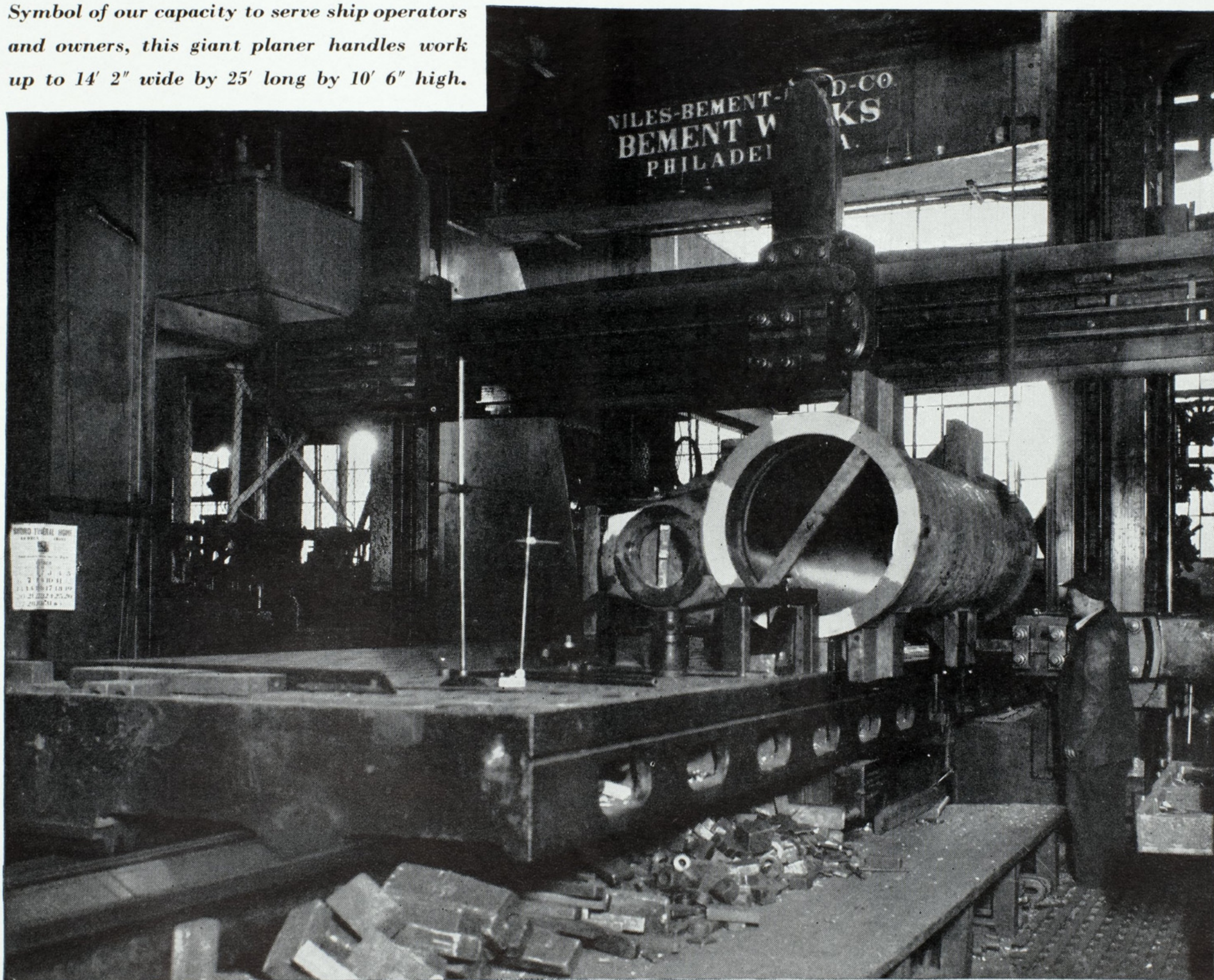
The greatest business successes are advertised products.

Make it easier for your salesmen to sell your products by advertising them.

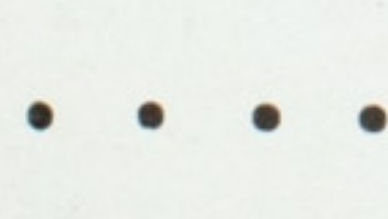
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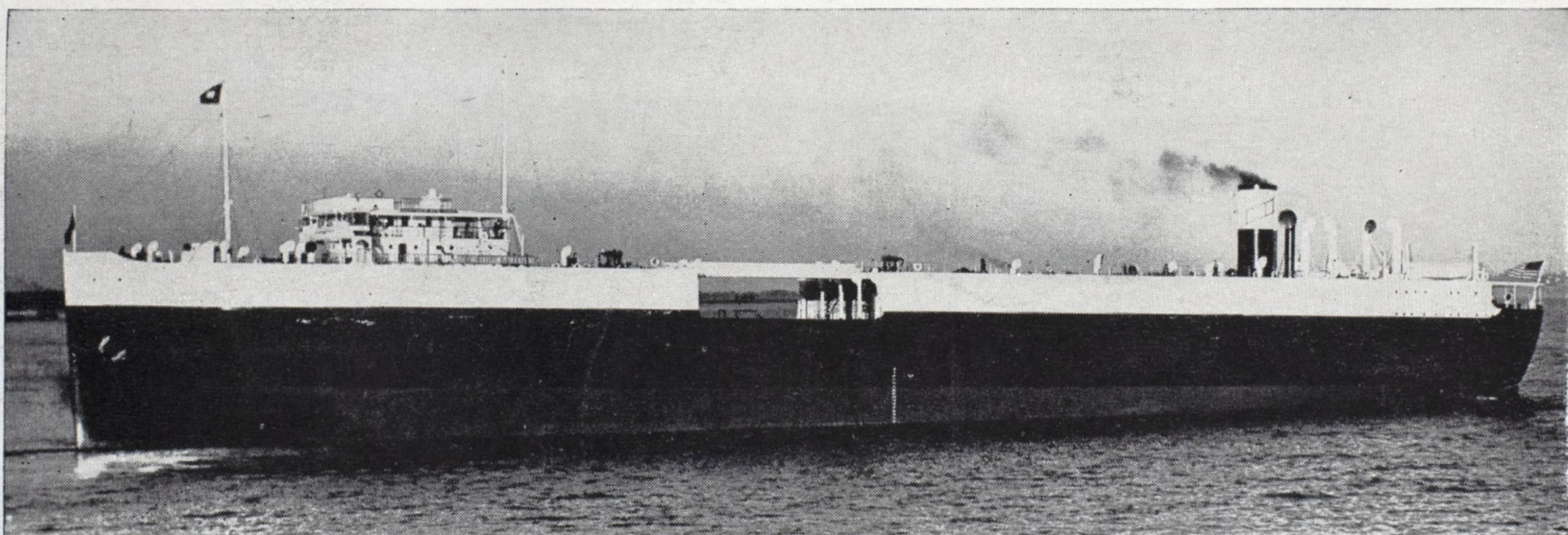
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